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Anthropology

NEW SERIES, NO. 29

Archaeological Survey in the Juli-Desaguadero Region of Lake Titicaca Basin, Southern Peru

Charles Stanish
Edmundo de la Vega M.
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Cecilia Chávez Justo
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Archaeological Survey in the Juli–Desaguadero Region of Lake Titicaca Basin, Southern Peru

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This book reports on a systematic archaeological survey and reconnaissance in the southwestern Titicaca Basin of far southern highland Peru. Our survey covered approximately 360 km² in the Juli–Pomata region and discovered almost 500 sites. Additional large-site reconnaissance discovered several dozen additional major sites in the Ccapia and Desaguadero areas, south of the intensive survey zone. These single- and multicomponent sites represent more than 1,000 occupations that range in date from the Archaic Period (ca. 5000–2000/ 1500 B.C.) to the Early Spanish Colonial Period (A.D. 1532–1700). In this book, we review previous research in the region, describe the overall research design and methodology, describe the study area, and provide a site typology, a ceramic typology, a tomb typology, individual site descriptions, ceramic drawings, photographs, and settlement data. Finally, we interpret these data in light of previous research and assess their importance for understanding the prehistory of the southwestern Titicaca Basin.

This book is dedicated to the memory of John Hyslop, a pioneer of modern Lupaqa area archaeology.

C.S.S.

Preface and Acknowledgments

In June of 1988, the Juli Project began intensive archaeological investigations in the southwestern Titicaca Basin. The 1988 season was funded by the Wenner-Gren Foundation for Anthropological Research and the Montgomery Fund of the Field Museum of Natural History as well as by private donations from Ms. Patricia Dodson and Ms. Beverly Malen. These excavations were conducted in cooperation with, and under the direction of, the National Institute of Culture in Lima and Puno. By 1990, the Juli Project had evolved into the much larger Lupaqa Project, funded by the National Science Foundation (BNS 9008181, DBS 9307784) and the John Heinz III Trust of Pittsburgh, Mr. Robert Donnelley, Ms. Patricia Dodson, and Ms. Beverly Malen. Steadman's research was funded by a grant from the Fulbright-Hays Doctoral Dissertation Research Abroad program (PO22A90021). Frye and Seddon were funded by the Scholarship Committee of the Field Museum of Natural History.

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This book represents the cooperative efforts of all of the authors. The division of labor was roughly as follows: Charles Stanish, the principal investigator of the project, was responsible for the overall research design. The co-directors were Cecilia Chávez Justo and Edmundo de la Vega. Mr. de la Vega was in charge of the survey, and both co-directors were largely responsible for excavations in a number of sites in the region. De la Vega excavated at the sites of Pukara Juli and Palermo, and he is completing an intensive study of the Tiwanaku sites in the region. Ms. Chávez has since completed extensive excavations at the site of Sillumocco-Huaquina and is presently

working on a monograph on this work. Ms. Lee Steadman has been a participant in the Lupaqa Project since its inception in conjunction with her independent dissertation project north of the study area. She is largely responsible for working out the tremendously difficult pre-Late Intermediate Period ceramic typology contained in this book. Mr. Kirk Frye is one of the founding members of the Project. He served as field supervisor for the intensive survey, mapped several sites, and found a number of sites outside of the intensive survey zone. He has since completed independent dissertation research in the Chucuito area. Mr. Matthew Seddon analyzed the lithics at several sites, was a crew member in the survey, and returned in 1994 to work on excavations. He has since begun work on a dissertation project on the Island of the Sun in Bolivia. Mr. Luperio Onofre began as student

participant in 1988, worked as a survey crew member, and has worked with us since that time. He worked on an ethnographic study of Aymara agricultural land categories that is summarized in this monograph. Mr. Percy Calisaya Ch. has been a participant of the project since its inception and served as a crew member on both the survey and reconnaissance. He and Mr. Onofre were also responsible for correcting orthographic and toponymic errors, and they are largely responsible for the excellent relations between the Project foreigners and the communities. We also thank Ms. Marjorie Pannell, managing editor of *Fieldiana*, for her excellent work and patience, and Ms. Diane White for providing photographic services.

Although this book represents the cooperative efforts of all of the authors, any errors in the text ultimately remain the responsibility of the principal investigator.

An Introduction to the Juli–Desaguadero Survey

At 3810 m above sea level, Lake Titicaca is the world's highest major lake. The Titicaca Basin of the central Andes is also one of the great centers of ancient civilization in the Americas (Figs. 1 and 2). The Titicaca region supported dozens of complex societies prior to the European conquest, including Pucara, Tiwanaku, Chiripa, and many other as yet unknown cultures. This area is in the heartland of the ethnohistorically known Lupaqa "kingdom," one of several powerful polities that developed in the Titicaca Basin in the centuries prior to the Inca conquest in the mid-15th century (Figs. 3–6). The altitude, geography, and severe climate of the area provided a rich and unique ecological setting for the development of complex pre-industrial societies in the Americas. Because of the richness and diversity of cultural development of the southwest Titicaca Basin, the region constitutes a superb laboratory for the study of long-term cultural processes in this center of prehispanic civilization.

Prior to our research there had been no systematic and intensive archaeological survey of the entire region of the western Titicaca Basin. This book presents data from such a regional settlement survey and large-site reconnaissance in the southwestern Titicaca Basin. The archaeological sites in the Titicaca Basin have been studied for more than 100 years on both the Peruvian and Bolivian sides. These previous investigations provide a chronological and cultural historical framework within which to understand the archaeological data obtained in this project. The previous research has also permitted archaeologists to develop models to understand the economic and political evolution of complex society in the region.

It was in this context that we initiated the Lupaqa Project in 1988. The original purpose of this project was to test models of political economy of the later prehistory of the Lupaqa area. In particular, we were interested in the nature of the Lupaqa polity prior to the Inca conquest and the origins of that polity in the context of Tiwanaku collapse around A.D. 1100. Our data have provid-

ed substantial insight into these critical problems in this period of Titicaca Basin prehistory.

The data collected were also relevant to a number of other problems beyond those of the primary research goals. For instance, our research has allowed us to define new pre-Tiwanaku polities in the Juli area that we have named Early Sillumocco and Late Sillumocco (Stanish & Steadman, 1994). We have furthermore discovered contemporary pre-Tiwanaku polities in the Pomata–Yunguyu area that we have named Early Ckackachipata and Late Ckackachipata. We have also discovered a number of early sites that represent the first settled villages in the southwestern Titicaca Basin that we have named the Pasiri culture. In addition, we identified a substantial Tiwanaku settlement system that provides insight into the nature of Tiwanaku expansion. A substantial Inca and Early Colonial Period settlement system was also discovered in the survey; such data provide insight into the expansion of the Inca state and early Spanish Colonial political and economic organization. Relict raised fields were also located in three areas of the intensive survey area and in a number of areas in the reconnaissance zones. The association of fields and archaeological sites provides a powerful means of assessing models of raised-field agricultural land use dynamics in the Titicaca region (Stanish, 1994).

In this book we introduce the critical anthropological problems of the prehistory of the area. Our research design and methodology are described in detail. Most important, this report contains the bulk of our survey and reconnaissance data, which we present in graphic, tabular, and descriptive form. Finally, we offer as many interpretations of these data as possible to help clarify a number of problems in Titicaca Basin prehistory.

The core of this monograph is descriptive, although we offer a number of interpretations in the concluding chapter. The Lupaqa Project is an ongoing, multidecade research effort that will continue to expand in the future. This organization provides both strengths and weaknesses. The strength

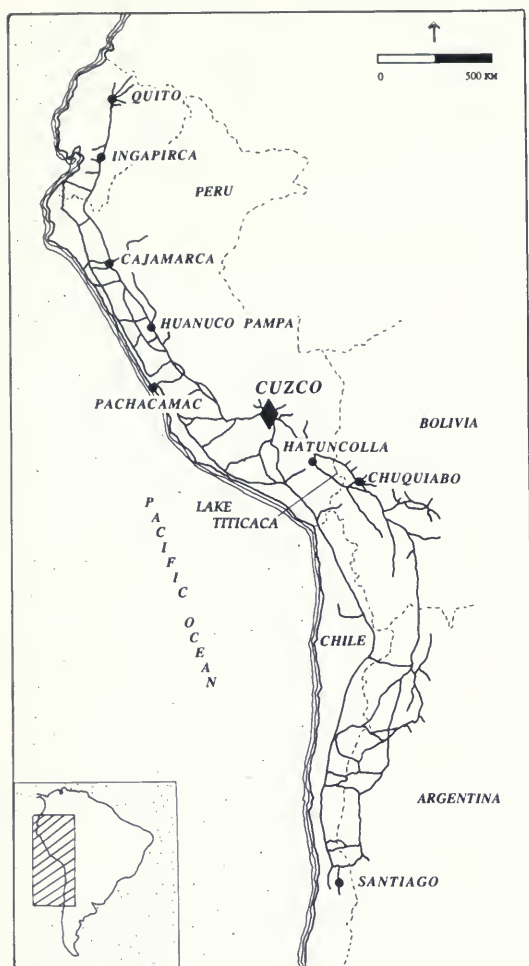


FIG. 1. South-central Andes.

of a program of continual research is that ideas can be tested, refined, rejected, or confirmed after every season. The major weakness is that there is, in effect, no definitive end to data collection and therefore no definitive beginning to the “final” interpretations of the data. Monographs such as this must therefore be understood in such a research organization context. Interpretations of the data must be couched in a larger framework that anticipates future research. We therefore assiduously try to avoid overinterpretation.

Our goal in presenting this work is to follow a strict logic of data interpretation. At present, we can offer certain definitive empirical statements in regard to some key questions about Titicaca Basin archaeology (size and intensity of the various occupations, existence of raised fields, location of major sites, descriptions of pottery types, and so

on). Furthermore, we can use intensive analyses of these data to define empirical patterns useful for assessing specific theoretical questions, as exemplified by recent publications and monographs, including de la Vega (1990), Frye (1994), Stanish (1994), Stanish et al. (1993), and Stanish and Steadman (1994). Other questions cannot be adequately dealt with, given our current data, and we will merely provide the framework for future research in this monograph.

The Study Area

Our initial work in the Juli area was conducted at the suggestion of John Hyslop, who felt that the area would be the most appropriate place to begin survey of the large fortified sites, or *pukaras*, such as Pukara Juli. He also thought that the site of Tumatumani potentially had the entire southwestern Titicaca Basin ceramic sequence represented in its middens. His reconnaissance then provided the basis for our full regional coverage survey. On the strength of his interest and knowledge in the region, we have dedicated this book to him.

Our initial work in the Juli area made it clear that many important anthropological questions having to do with Titicaca Basin prehistory could be answered with data from the region. As we mentioned earlier, the 1989 season indicated that the full range of periods was represented in the study area. Furthermore, the vast tracts of raised fields in the Moyopampa area were of particular interest to the principal investigator. At this time, we decided that the Juli area and the region to the south, toward areas of greater Tiwanaku and Chiripa influence, would be the most appropriate area for intensive survey.

The study area is divided into three large sections (Fig. 7). The first is the Juli–Pomata intensive survey region. This area begins at Santiago Chambilla in the north and continues to the extensive pampa immediately south of Pomata. The other two areas are the Ccapia reconnaissance area and the Desaguadero reconnaissance area (Fig. 7). These reconnaissance areas were not intensively surveyed; rather, we conducted large-site reconnaissance in these areas. The intent was to intensively survey as much of the area as possible between Juli and Desaguadero in the 1991 and 1992 seasons. Once our resources were al-

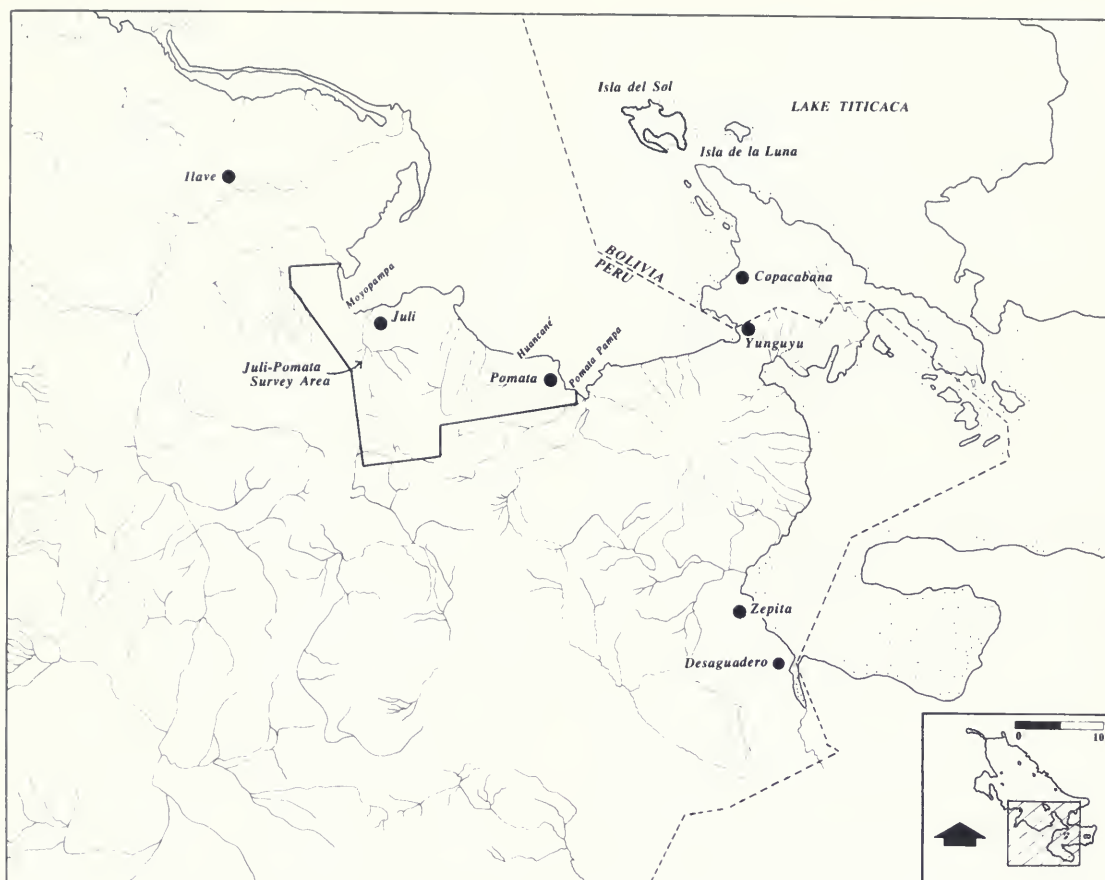


FIG. 3. Juli-Desaguadero area.

yields occur in the warmer *suní* zones and in the lower *puna*. Overall, by far the most important economic product of the *puna* is the camelid, particularly the llama and the alpaca. Camelids provide wool and meat and serve as pack animals. The virtually unique capacity of the Titicaca Basin to support such large camelid herds has contributed to its position as a major center of civilization in the Americas.

Different ecological studies have suggested a more complex mosaic of resource zones than the simple *suní/puna* distinction (e.g., Troll, 1968). Tosi (1960), for instance, lists eight zones for the Titicaca region, a classification based upon the Holdridge system. Likewise, Bertonio's dictionary provides a rich vocabulary of agricultural terms from the 16th century, suggesting that the indigenous populations had a much more complex perception of their environment than the mere *suní/puna* division (Bertonio, 1956[1612]). However, in most cases, Pulgar Vidal's distinction between the

agricultural and pastoral zones is adequate for a number of analytical purposes (e.g., Stanish, 1994).

The scientific classifications of Pulgar Vidal, Tosi, and others are useful typologies for understanding the ecology and geography of the region. However, our research team noted that contemporary Aymara farmers and herders possess an extremely sophisticated and subtle understanding of their environment that differs in some important aspects from those of professional agronomists and geographers. Appendix 1 is a study of Aymara soil typologies conducted in 1994 by Luperio Onofre Mamani.¹ Mr. Onofre interviewed a

¹ In retrospect, we made a mistake in not conducting this study prior to the survey and reconnaissance. We should have collected the survey data with these categories. These categories are too subtle to reconstruct from maps and site locations, and a resurvey is not feasible. Future research designs will include several permanent, professional informants who can classify site locations based on this or similar typologies.

<i>Absolute Chronology</i>	<i>Tiwanaku Area</i>	<i>North Titicaca Basin</i>	<i>Juli Region</i>	<i>Ccapia Area</i>	<i>Desaguadero Area</i>	<i>Relative Chronology</i>
1500	<i>Inca</i>	<i>Inca</i>	<i>Inca</i>	<i>Inca</i>	<i>Inca</i>	<i>Expansive Inca</i>
1000	<i>Pacajes</i>	<i>Colla</i>	<i>Lupaqa</i>	<i>Lupaqa</i>	<i>Lupaqa (?)</i>	<i>Altiplano</i>
	<i>Tiwanaku V</i>	<i>Tiwanaku V</i>	<i>Tiwanaku V</i>	<i>Tiwanaku V</i>	<i>Tiwanaku V</i>	<i>Expansive Tiwanaku</i>
500	<i>Tiwanaku IV</i>	<i>Tiwanaku IV</i>	<i>Tiwanaku IV</i>	<i>Tiwanaku IV</i>	<i>Tiwanaku IV</i>	
AD/BC	<i>Qeya</i> <i>(Tiwanaku III)</i>	?				
	<i>Kalasasaya</i>	<i>Pucara</i>	<i>Late Sillumocca</i>	<i>Late Ckackachipata</i>	?	<i>Upper Formative</i>
500	<i>Late Chiripa</i>	<i>Cusipata</i>				
	<i>Middle Chiripa</i>		<i>Early Sillumocca</i>	<i>Early Ckackachipata</i>	?	<i>Middle Formative</i>
1000	<i>Early Chiripa</i>	<i>Qaluyu</i>				
			<i>Pasiri</i>	<i>Pasiri</i>		
1500	?	?				<i>Early Formative</i>

FIG. 4. Various chronologies of the Titicaca Basin.

number of farmers in the Juli region and developed the categorization of contemporary Aymara agricultural land use that begins on p. 125 of this book. Onofre's study of Aymara agricultural terms indicates that there are differences between Western and indigenous concepts of land typologies. These differences merit much more anthropological work.

Previous Research

The research presented in this book is based on several years of preliminary work conducted in the Juli area (Onofre, 1989; de la Vega, 1990; Stanish & Steadman, 1994) that, in turn, was based on the previous research of dozens of other scholars for over a century. Upon our arrival in Juli in the summer of 1988, we had available a number of 16th-century documents and various site reports on the prehistoric occupations of the region. John Hyslop's path-breaking dissertation survey research (Hyslop, 1976) was our only comprehensive source of data for the region. His work represents the first systematic and full-regional-coverage survey research design carried

out in the region to date. Hyslop (1976, 1977, 1984, 1990) and Elias Mujica (Mujica, 1987, 1990) reconnoitered the area and systematically located sites described in the historical documents, corroborated reports by previous scholars, and developed some broad models to describe and explain the prehistory of the region. The work of both Hyslop and Mujica indicated that a number of site types and cultural periods were well represented in the Juli-Desaguadero region. Hyslop's 1976 dissertation, along with information in some subsequent publications (Hyslop 1977, 1984, 1990; Mujica, 1990:172) provided a very useful chronology, as well as a typology of sites and tomb forms.

There is substantial historical documentation for the Lupaqa area that provides data suitable for the construction of models for the late prehistoric periods. The inspection of the Lupaqa region made by the Spanish crown official Garci Diez de San Miguel (1964[1567]) represents one of the finest Spanish Colonial Period documents in the Andes. In many ways, the Garci Diez *Visita* represents one of the first comprehensive ethnographic databases on a major ethnic group in the Titicaca Basin. Arriving in the Titicaca Basin in 1566-1567, Garci Diez sought to document the



FIG. 5. Major polities in the Titicaca Basin in the 16th century.

status of the people in the Lupaqa region, which was one of the principal indigenous *señoríos*² of the southwestern Titicaca area.

The Lupaqa were one of a few indigenous ethnic groups in the entire Andes not granted to individual Spaniards in *encomienda* (Murra, 1964: 422). That is, this group was maintained as a crown holding, directly under royal control and protection. Unlike other native populations under the *encomienda* system, the Lupaqa paid tax directly to the Spanish Crown and therefore maintained a relatively high degree of autonomy. This economic fact underlies the purpose of the *Visita*; Garci Diez was sent to record the population of able-bodied tributaries and determine earnings from herding, farming, and other economic activities in order to assess their capacity to pay taxes (Garci Diez, 1964[1567], pp. x, 5, 10).

The *Visita* is composed of a series of questions and answers from extensive interviews with the heads of the Lupaqa moiety and Spanish residents in the area. Given that Garci Diez was primarily concerned with establishing the tax base of the region, the elicited answers focus on the more mundane economic and political aspects of Lupaqa life. The result is a comprehensive and systematic document containing information of social, economic, and political value. Furthermore, a careful reading of this document provides insight into people other than the Aymara, such as the "Uru," Pukina, Quechua, "Choquela," and a number of other groups in the region.

The pertinent information in the *Visita* includes declarations of all towns subject to Martín Curi and Martín Cusi, the *principales* of the Hanansaya and Hurinsaya moieties. Other types of socioeco-

nomic information include a list of all *ayllus* in the subject populations, the number of Catholic priests in each town, payments to the church, the nature of tribute during the Inca occupation, the size of camelid holdings, earnings from various economic activities, and the resources controlled by various elite. Garci Diez was careful to repeat questions to different individuals, providing different answers and perspectives on critical questions.

The *Visita* provides an excellent window on the political and economic structure of the Lupaqa region about one generation after the conquest. Of particular value are the differences between the responses of the Spaniards and the local Aymara elite. Any document, including the *Visita*, is replete with subjective biases. Garci Diez was a tax collector, and the Aymara elite were clearly trying to hide their wealth during the *Visita* and simultaneously to inflate the resources and influence that they had during the Inca and pre-Inca periods. Furthermore, many of the Spaniards were guilty of theft, battery against Indians, and cheating the Spanish Crown as well. They had a distinct self-interest in representing the indigenous people in a different light.

Like the *Visita* of Garci Diez, the *Tasa* of Toledo (Cook, 1975) provides some systematic data on the indigenous populations of the region. Of particular importance are Toledo's tribute lists from many of the towns in the region. The published data in the *Tasa* center on areas outside of the Lupaqa polity.

Another great source of data for Aymara culture in the Early Colonial Period is the dictionary of Ludovico Bertonio, published in 1612[1956]. Bertonio compiled a general list of Aymara words and Spanish translations. Of particular interest to archaeologists are words relating to agricultural

² The term "señorío" is translated in a variety of ways, including "chiefdom," "feudal estate," "kingdom," and the like.

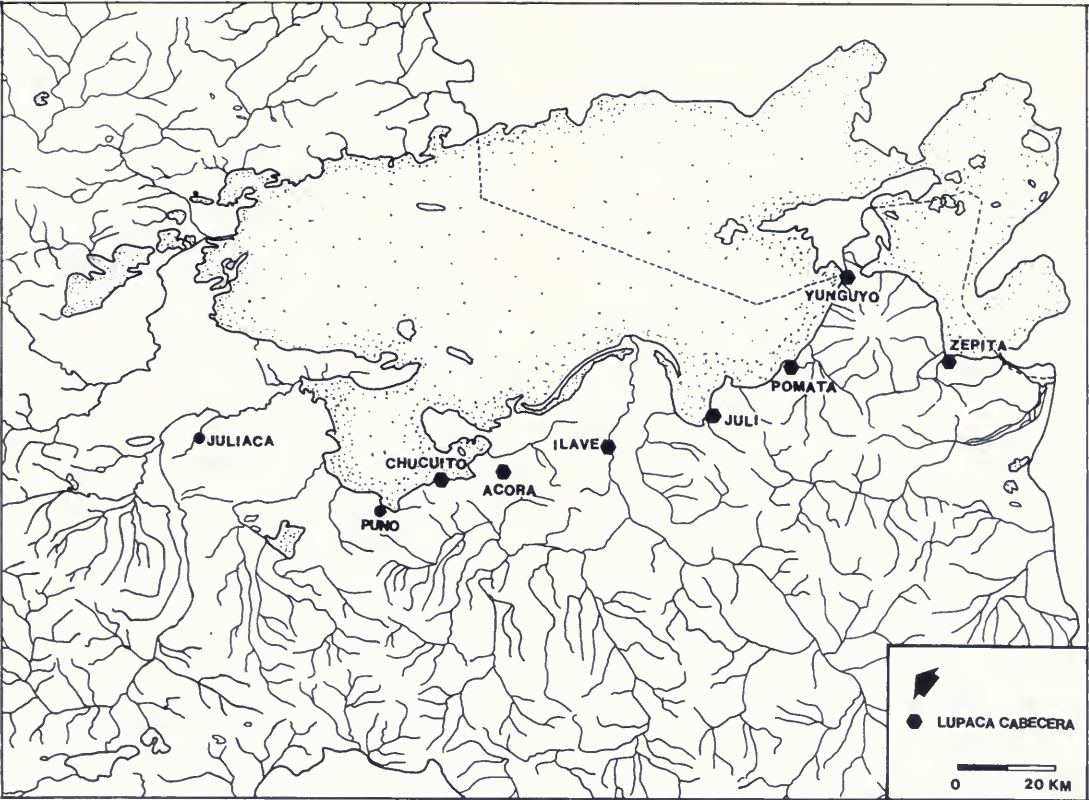


FIG. 6. Lupaqa cabeceras in the 16th century.

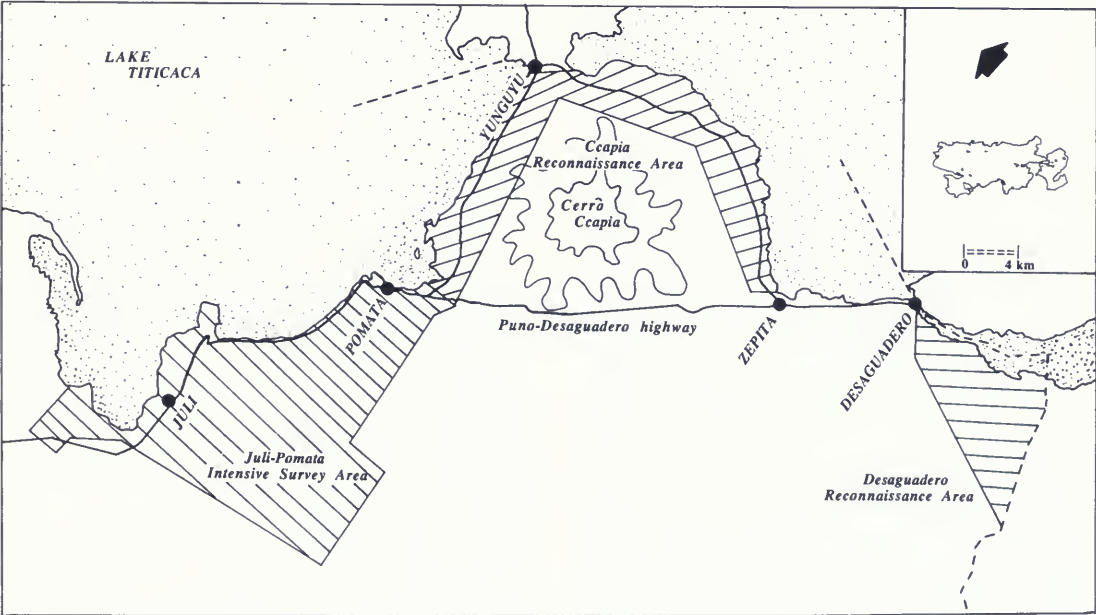


FIG. 7. Study area.

and ecological features. The more general histories of Bernabé Cobo (1956[1653]), Garcilaso de la Vega (1961), Ramos Gavilán (1988[1621]), and Cieza de León (1959[1553]) make a number of references to the southwestern Titicaca Basin. Cobo, a Jesuit priest who lived and worked in Juli region in the 16th century (Cobo, 1956[1653]), actually provided one of the first descriptions of the major archaeological site of Pukara Juli on the hill that looms above the city.

Some of the first modern archaeological reports in the Lupaqa area include the work of Franco and González (1936), who demonstrated that Lupaqa sites were associated with large stone mortuary towers known as *chulpas* (see Bandelier, 1905³; Hyslop, 1977; Aldunate and Castro, 1981). Curiously, some of these towers had Inca-like masonry. These data, combined with Rydén's work on the Bolivian side (1947, 1957), served to tie in the Lupaqa *chulpa* sites to the post-Tiwanaku/pre-Inca periods in the altiplano. Likewise, Vásquez and Vásquez et al. published brief reports (Vásquez et al., 1935; Vásquez, 1939) on the sites of Cutimbo and Tanka Tanka, both of which are found in the Lupaqa zone.⁴ The existence of *chulpas*, which were said by Cieza de León (1959[1553]), Cobo 1956[1653], and Guamán Poma (1980, p. 270), among others, to be burial towers of the elite, suggested that the pre-Inca Lupaqa maintained a complex society, with social and political hierarchies (Rydén, 1947, p. 407).

In the survey area, Ephraim Squier described and drew some cut stones on the Inca road that are constructed in an Inca style. He described these as "The Inca's Chair" Squier (1877, p. 350). These cut stone monuments are just outside of our survey area in the north and are similar to the Inca cut stone outside of Copacabana that is most likely associated with the Inca shrine complex. Near Challapampa, an area in the southern side of our survey zone, Harry Tschopik (1951, p. 506) first described the large, Late Horizon *chulpas* that are found along the north side of the hill that rings the low pampa zone. Hyslop (1977) also noted some cut stone near the site of Lundayani (009) with an associated Inca occupation.

³ Bandelier (1905) felt that *chulpas* were storage structures and not burial towers.

⁴ Cutimbo has since been mapped by the INC-Puno with assistance from the Field Museum of Natural History and the Lupaqa Project. The map indicates a substantial settlement, with predominantly round structures. One of us (Frye) has completed systematic research at Cutimbo.

Marion Tschopik's work, published in 1946, included excavations at Chuquito in Late Horizon contexts, as well as a reconnaissance of a number of sites away from the lake. Tschopik correlated two basic ceramic styles to the Lupaqa area. She named these Chuquito (1946, pp. 28–29) and Alilita Amaya (1946, p. 34) and dated them to the Inca and pre-Inca periods, respectively. This pioneering research provided the first correlations of Lupaqa area sites with specific archaeological indicators. Tschopik (1946) also published drawings of Tiwanaku and Inca pottery, and she developed a typology of *chulpa* types in the region.

Alfred Kidder reconnoitered the northern and western Titicaca Basin and had visited the Ilave Pampa (Kidder, 1943). He located a number of Tiwanaku and Pucara sites in his survey (his primary interest), two of which, known as Asiruni and Sarapa, were in the Ilave Pampa just north of Juli (Fig. 2). Kidder's reconnaissance ended just short of the northern part of our systematic survey, and he apparently never published on major sites in the Juli–Desaguadero region.

Hyslop synthesized the available data on the Late Horizon occupation into a "Chucuito and Inca Macropattern" (Hyslop, 1976). Sites of this macropattern were characterized by significant quantities of Inca pottery, structures built with fine stone masonry, association of the settlements with formal roads, and site location oriented toward the low, undefendable lakeside areas. In his dissertation (1976), he located several sites that we also recorded on the survey and reconnaissance.

Research Strategies of the Lupaqa Project

A long-term, multiyear research strategy involves several stages of fieldwork and laboratory analysis. Our first stage of research involved the systematic surface collection, excavation, and mapping of two key sites in the area during the 1988 season: Tumatumani (001) and the Yacari–Tuntachawi (003) section of Pukara Juli.⁵ Hyslop had included these sites in his reconnaissance report of 1976. Based on his work and our own observations, we noted that the surface ceramics

⁵ The numbers in parentheses refer to the site number in the Juli–Pomata intensive survey area registry (see Tables 1 and 2).

from these two sites spanned the entire range of agricultural occupation in the region. Our research at these two sites, plus the work of one of us on an independent project north of the study area, provided a refined chronology for the Juli–Pomata area. The ceramic chronology and typology that we offer here builds on the earlier work of both Hyslop and Mujica and provides more refined periods for the pre-Tiwanaku and Early Spanish periods while retaining the Tiwanaku and Altiplano periods as defined by both authors. The results of the Tumatumani excavation were reported by Stanish and Steadman (1994). The excavations and mapping data from Yacari–Tuntachawi can be found in de la Vega (1990) and Stanish et al. (1993).

The 1989 season was devoted to intensive analysis of the artifacts recovered from the previous seasons, reconnaissance of a small area associated with raised fields in the Moyopampa area, and additional reconnaissance around the area in general. This work constituted the second stage of our research. The 1989 season was important in that for the first time, we began to develop a regional perspective on the archaeological materials in the Juli region. The reconnaissance was nonsystematic. This was, quite frankly, the result of a lack of funding for any intensive research during this year. In spite of this shortcoming, the 1989 season was a real turning point for us. We confirmed the enormous raised-field complex in the Moyopampa region, and we located a number of sites from virtually every time period in the region. The 1989 season permitted us to develop a working typology of sites and to “test” the utility of the ceramic chronology; it also gave us an overall impression of settlement diversity and density in the region. In addition, it provided the data necessary to produce a research proposal for a regional survey.

The third stage of research involved an intensive, systematic, problem-oriented regional survey plus a nonsystematic, large-site reconnaissance. The results of this work are presented in this monograph. Additional stages of research include the excavation of specific sites that were discovered on the survey. These were performed to test problems that we defined from the settlement and excavation data. We have excavated three additional sites in the region since our initial excavations of Tumatumani (001) and Pukara Juli (003) (de la Vega, 1990). These sites are Palermo (212), named after an old hacienda where the site was found; Sillumocco–Huaquina (158), located

near the lake just north of Juli; and San Bartolomé–Wiscachani (022), an early site located on the large hill south of Juli. Palermo (212) and Sillumocco–Huaquina (158) are two of the largest Formative and Tiwanaku sites in the Juli region. San Bartolomé–Wiscachani (022) represents a very early Late Archaic/Early Formative transitional site in the region, and it has since been excavated by Mark Aldenderfer in an independent project (see below for descriptions of the chronology used in this research). These excavation data have yet to be adequately analyzed and will be published in monograph form in the next few years, in a manner similar to that for Tumatumani (Stanish & Steadman, 1994).

A Chronology for the Southwestern Titicaca Region

There is no standard or generally recognized chronology for the Titicaca Basin, although a number of frameworks have been proposed and used in the past. Several scholars have utilized the Ica master sequence to order the archaeological materials in the Titicaca Basin (e.g., Chávez, 1988a; Erickson, 1988). The basic problem with using this framework is that the cultural history of the south coast is simply too different prior to the Middle Horizon to be directly applicable to the Titicaca Basin in any but the most general manner. Our research indicates that a modification of the existing chronologies for the Titicaca Basin is warranted.

There are several possible chronological frameworks for the Titicaca Basin. In practice, most chronologies for the central Andes contain elements of both evolutionary and historical frameworks. An example of such a chronology is that of Lumbreras (1974a,b). His seven-period chronology for the entire Peruvian central Andes encompasses the Titicaca region.

The most commonly used chronology for the southern Titicaca Basin, referred to here as the “Bennett–Ponce” chronology (see pages 11–12 below), also contains elements of both historical periods and evolutionary stages. Bennett (1934, 1936, 1938) explicitly utilized a developmental sequence for Tiwanaku and named his periods “Early Tiahuanco,” “Classic Tiahuanaco,” and “Decadent Tiahuanaco,” respectively. Ponce adopted this framework, renamed the last three periods using numerals, and added two earlier

phases. Numbered Tiwanaku I through Tiwanaku V and given specific dates, the Ponce sequence at first appearance would seem to be strictly a historical chronology. However, in *Tiwanaku, Espacio, Tiempo y Cultura* (1972), Ponce Sanguines assigns developmental qualities to each of the five periods. Tiwanaku I and Tiwanaku II, for instance, were argued to be “formative” in character (Ponce Sanguines, 1972, p. 75). Tiwanaku III and IV, in contrast, were characterized as “the second stage of a fully urban character” (Ponce Sanguines, 1972, pp. 75–76). The final stage, Tiwanaku V, was expansionistic or “imperial” in character (Ponce Sanguines, 1972, p. 85). In the Bennett–Ponce framework, therefore, there is an implicit evolutionary dynamic combined with a series of absolute dates.

The classic horizon framework for the Andes is derived from a type sequence from the valley of Ica on the south Peruvian coast. Each period is absolutely dated with reference to the Ica materials. A horizon represents the rapid and widespread distribution of an art style associated with a particular culture or cultural tradition, such as Chavín (Early Horizon), Wari and Tiwanaku (Middle Horizon), and Inca (Late Horizon). The horizon framework presupposes that the materials from a particular horizon are roughly contemporary across space. The horizon chronology is therefore an appropriate framework for ordering all archaeological materials in an area in which styles typical of that horizon are found.

The question facing us is, what is the most appropriate chronological framework for the Titicaca region? There is no correct answer, of course. The choice depends on the types of questions that we are interested in answering and the types of data that we have to deal with the archaeological remains. We have adopted a dual chronological system that formalizes both historical and evolutionary approaches in central Andean archaeology in general, and in the Titicaca Basin in particular. In the first instance, we use a broad evolutionary chronology that we feel is applicable to the Titicaca Basin as a whole. Parallel to this evolutionary chronology, we employ local historical chronologies for different areas such as the Juli region, the Desaguadero area, the Tiwanaku area, and so forth. We retain certain features of the Ica sequence (the Expansive Tiwanaku and Expansive Inca periods, for instance, that generally correlate to the Middle Horizon and Late Horizon, respectively), but we have altered this se-

quence to fit the Titicaca Basin cultural history according to our data.

The general chronology is represented by eight periods: Late Archaic (ca. 5000–2000/1800 B.C.), Early Formative (ca. 1800/1300–1300/900 B.C.), Middle Formative (1300/900–500/200 B.C.), Upper Formative (500/200 B.C.–A.D. 400), Expansive Tiwanaku (A.D. 400–1100), Altiplano (A.D. 1100–1450), Expansive Inca (A.D. 1450–1532), and Early Spanish Colonial (A.D. 1532–1700). Alongside the general chronology are the local historical chronologies, providing a dual system for every area. The chronologies that we utilize are shown in Figure 4.

The Titicaca Basin-wide chronology is reviewed below. The regional chronologies for the Juli, Ccapia, and Desaguadero areas are defined in the text in the following chapters.

The Late Archaic Period (ca. 5000–2000/1800 B.C.)

The earliest cultures in the Titicaca region are collectively designated as the Archaic Period. The Archaic Period occupations represent the first human populations in the Titicaca Basin and date to at least 5000 B.C. (Lumbreras, 1974b, p. 35). The Late Archaic was a period characterized by largely mobile hunters and collectors, low population densities, and a dependence on lacustrine and nondomesticated flora and fauna.

There has been very little work in the region on this period, with the exception of a few brief and inaccessible reports (e.g., Palao, 1989). A number of Late Archaic Period sites were discovered on our survey, defined by distinctive lithic diagnostics, particularly bifaces. Although these sites fall outside of our proposed research interests, their future study will serve to refine our understanding of the pre-agricultural periods in the southwestern Titicaca region.

The Early Formative Period (ca. 1800/1300–1300/900 B.C.)

The large time period from the earliest sedentary, primarily agricultural populations of the region to the emergence of the Tiwanaku state as an expansive polity constitutes the Formative Period in Titicaca Basin prehistory (ca. 1800 B.C.–A.D. 400). Following Lumbreras (1974b), we recognize three large divisions in the Formative Pe-

riod, defined in evolutionary terms: the Early, Middle, and Upper Formative (Fig. 4).

The Early Formative is defined here as the time period from the earliest sedentary populations to the development of recognizable political and economic ranking in Titicaca Basin societies. This period began as early as 1800 B.C. in some areas in the north and south Titicaca regions; it may have begun as late as 1300 B.C. in other areas. The local expression of the Early Formative in the Juli region, for instance, is referred to as the Pasiri Period. We estimate the Pasiri Period to have begun around 1300 B.C., perhaps half a millennium later than in other areas. The Early Formative Period was characterized by small villages located in optimal agricultural and pasture zones.

The Middle Formative Period (1300/900–500/200 B.C.)

The Middle Formative Period represents the establishment of ranked society in the Titicaca Basin. It is during this period that there is evidence of corporate labor organization well above the capacities of individual households. Such labor organization is associated with ranked, or simple chiefly, societies in anthropological theory. The result of this more complex labor organization is particularly evident in the development of elaborate architecture and ceramic traditions. The most important of the Middle Formative cultures are Qaluyu (ca. 1300–500 B.C.) and Early and Middle Chiripa (1300–850 B.C. and 850–500 B.C., respectively, see Chávez, 1988a, p. 2; Chávez, 1988b). The Middle Formative societies flourished from at least the beginning of the first millennium B.C. (Qaluyu in the north and Chiripa and Chiripa-related sites in the south) to the middle to later first millennium B.C., with the establishment of the Upper Formative complex chiefdoms during Late Chiripa (500–200 B.C.), Cusipata (500–200 B.C.), Pucara (200 B.C.–A.D. 400), Kalasasaya (ca. 200 B.C.–A.D. 200), and Qeya (A.D. 200–400) times.⁶

The Middle Formative represents the first period for which there are good settlement data in the Juli–Pomata region. It appears that the development of ranked society occurred relatively late in the Juli area compared with the northern and southern Titicaca Basin. The Early Sillumocco Period in the Juli area represents the local ex-

pression of the Middle Formative. It dates to around 900–200 B.C., based on stylistic comparisons made by Steadman (in Stanish & Steadman, 1994) and a single C-14 date from an Early Sillumocco fill episode at the site of Palermo, near Juli (see below).

In the Pomata–Chatuma area, another simple ranked society that developed during this period is named Ckackachipata, after the largest site in the region at this time. Early Ckackachipata represents an autonomous polity contemporary with the Qaluyu, Cusipata, Early Sillumocco, and Middle and Late Chiripa polities in the Titicaca region. The Early Ckackachipata polity is similar to that of the Early Sillumocco in scale and complexity, with the exception that it appears to have had a stronger relationship to the Chiripa and Tiwanaku areas.

The Upper Formative Period (500/200 B.C.–A.D. 400)

The Upper Formative represents the development of the first markedly ranked societies in the Titicaca region. These societies would correspond to models of complex chiefly organization in the anthropological literature. The adoption of hereditary social and political ranking, paralleled almost certainly by an economic hierarchy, marks the transition from the Middle to the Upper Formative Period in the Titicaca region. The Upper Formative is therefore defined as the period in which complex chiefdoms developed and were the dominant political organization in the region.

A number of complex chiefdoms developed in the region at this time—possibly the Cusipata Period in Pucara (500–200 B.C.), Pucara Classic (200 B.C.–A.D. 400), Late Chiripa (500–200 B.C.), Kalasasaya (ca. 200 B.C.–A.D. 200), Late Sillumocco (200 B.C.–A.D. 400), Late Ckackachipata (200 B.C.–A.D. 400), and Qeya (A.D. 200–400). We believe that Kalasasaya ultimately replaced Late Chiripa in the southern Titicaca region, and that Qeya, in turn, developed out of Kalasasaya (see Albarracín-Jordan & Mathews, 1990; Mathews, 1993).

Complex, ranked societies developed earlier in the northern and southern Titicaca region than in the Juli–Desaguadero area by several centuries. In the Juli region, the Late Sillumocco Period represents the local expression of the Upper Formative complex chiefly society in the area. The Late Sillumocco period dates from approximately 200

⁶ The dates provided for these cultures are tentative and will undoubtedly be refined with future research.

B.C. to around A.D. 400 (Stanish & Steadman, 1994, p. 8). Another complex chiefly society developed south of the Juli region in the Pomata area, out of the Early Ckackachipata polity of the Middle Formative Period. Our data suggest that the Late Ckackachipata polity is similar in size and scale to the Late Sillumocco polity.

The Expansive Tiwanaku Period (A.D. 400–1100)

Sometime in the middle of the first millennium A.D., the Tiwanaku peoples expanded out of the southern basin and established some type of control or influence over the entire Titicaca region. The development of Tiwanaku as an expansive state represented a new cultural phenomenon in the Titicaca region. In the earlier Upper Formative Period, complex chiefly polities such as Pukara, Late Sillumocco, Late Chiripa, and so forth were much smaller in size. They generally covered a territory of no more than 1 or 2 days' travel from the principal site of what was probably the residence of a paramount lineage. Our research strongly suggests that Tiwanaku forcibly incorporated the southwest Titicaca Basin south of the Ilave River into its political and economic orbit. Due to the nature of the Tiwanaku expansion, this control appears to have been established quite rapidly. By the times of Tiwanaku IV and V (A.D. 400–1100), the Tiwanaku people had built the first expansive, archaic state south of Cuzco. We use the chronological and evolutionary term "Expansive Tiwanaku" for the Juli–Desaguadero region to refer to the period in which the Tiwanaku state maintained an actual control of the region.

The Expansive Tiwanaku Period in the Juli–Desaguadero area would therefore be roughly contemporary with Bennett's Classic and Expansive periods. It would also correspond to Ponce Sanguines' Tiwanaku IV and Tiwanaku V, and it would therefore date from ca. A.D. 400–1100. The low quantity and poor quality of the diagnostic ceramic fragments recovered made it impossible to phase a site as either Tiwanaku IV, Tiwanaku V, or both. In other words, we are unable to distinguish between Tiwanaku IV and V sites in the survey and simply use the term "Expansive Tiwanaku." This conservative convention is also used because we have yet to find evidence that certain details of the traditional Tiwanaku 4 and Tiwanaku 5 of Bennett (1934, 1936, 1948) and Ponce Sanguines (1972, 1976, 1981) are appli-

cable in the study area. Furthermore, there are no Tiwanaku-related sites in the Juli–Pomata region prior to the Tiwanaku IV period, although some Qeya (Tiwanaku III) and Kalasasaya (Tiwanaku I/II) pottery fragments were found as trade wares into the region.

Clearly, the pottery recovered on survey from Tiwanaku sites is *either* Tiwanaku IV *or* V, and in a number of cases we can actually type a sherd or two to one of these periods. However, because such surface collections have limited statistical value, it would be improper to phase sites to anything smaller than a generalized "Tiwanaku Expansive Period" at the present time. Hyslop (1976) had the same problem and simply phased sites as "Expansive Tiwanaku," referring to both Tiwanaku IV and V. We continue to use his cautious approach.

Like Hyslop, we are therefore unable to accurately split the Tiwanaku Period into smaller units. An extended discussion of the nature of the Tiwanaku and other ceramic artifacts discovered in the survey area awaits further intensive analysis. Obviously, subdividing the Tiwanaku occupation is one of the most urgent problems for future research.

The Altiplano Period (A.D. 1100–1450)

The collapse of the Tiwanaku state around A.D. 1100 ushered in the first political entities that 16th-century writers recognized as the Aymara "kingdoms" or "*señoríos*." The principal 16th-century Aymara polities include the Colla to the north, the Pacajes to the south, and the Lupaqa in the west and southwest. Other smaller polities include the Canas, the Cachi to the north, the very poorly understood "Omasuyus" to the east, and the Carangas to the south (Bouysson-Bey, 1986, 1987) (Fig. 5). Following Lumbreras (1974a, b) and Hyslop (1976), the period from the collapse of the Tiwanaku polity to the Inca conquest in the Titicaca Basin is referred to as the Altiplano Period. The Altiplano Period dates from approximately A.D. 1100 to 1450 and therefore approximates the Late Intermediate Period in the Rowe chronology. The Altiplano Period is also occasionally referred to as the "Lupaqa" Period or the "Regional Development Stage" in other chronologies (Lumbreras, 1974b, p. 179).

The Lupaqa area is located on the southwest side of the lake between Desaguadero and Chuquito (Figs. 2, 5) (Hyslop, 1976, 1977). Our

knowledge of the Lupaqa during the 16th century is quite good, thanks to ethnohistorical research on such documents as the *Visita* of Garci Diez de San Miguel (1964[1567]) and other classic chronicles by writers such as Cieza de León (1553) and Cobo (1956[1653]) (e.g., Murra, 1964, 1968, 1972, 1978; Pease, 1973; Julien, 1978, 1982). According to Cieza de León (1959[1553]), the Lupaqa was the single most powerful group to slow the southward expansion of the Inca empire. Lupaqa power and influence in the immediate pre-Inca periods is said by Cieza de León to have been so vast that it defeated its traditional northern rival, the Colla, and actually stopped Cuzco's conquest of the Titicaca Basin for a generation or more⁷ (Cieza de León, 1959[1553], Book 2).

The Lupaqa "capital" at Chuquito and six other large settlements or *cabeceras* were spread almost equidistantly along the shore of Lake Titicaca (Fig. 6).⁸ The 16th-century Lupaqa maintained a complex political economy in the high and cold Titicaca region. Like their Tiwanaku predecessors, the 16th-century Lupaqa augmented their economy by the establishment of colonies in the coastal valleys and eastern lowlands (Murra, 1968, 1979; Pease, 1973; Stanish and Pritzker, 1983; Stanish, 1989a, 1992). Combined, the Titicaca Basin provided a rich and expandable resource base while the economic colonies permitted access to a greater diversity of agricultural products not available in the altiplano. By the 16th century, the Lupaqa were characterized by a hereditary "king" ('Cari'), the existence of retainer populations ('*yana*'), and a demographic base of at least 100,000 inhabitants (Murra, 1968).

Hyslop's (1976) reconnaissance of the Lupaqa zone in the early 1970s was our only comprehensive database from the Lupaqa area Altiplano Period prior to our research. Hyslop's data suggested that sites recognized archaeologically (ceramics, *chulpas*, and architecture) as pre-Inca, post-Tiwanaku Lupaqa cover an area of at least 1,500 km². Hyslop found approximately 25 sites with

diagnostic ceramics from the Altiplano Period.⁹ He defined the associated settlement system as the "Altiplano macropattern." Characteristics of this pattern include hilltop, fortified-site location, the presence of *chulpa* burial towers, large walls surrounding dense habitation areas, round house foundations, and the presence of Altiplano Period ceramics.

In short, documentary sources provide a reasonable understanding of the 16th-century Lupaqa. This polity was one of the most important groups in the later prehistoric periods of the Central Andes, and it was one of the most powerful polities to develop near the core territory of Tiwanaku sometime after its collapse in the 12th century A.D.

One of the great questions facing Titicaca Basin archaeologists is the question of the hypothesized Aymara immigrations in the beginning of the first millennium A.D. In the Titicaca region, the Aymara migration hypothesis is generally not accepted by archaeologists, but it is generally adhered to by a number of historical linguists and some social anthropologists. It has been most forcefully argued by Alfredo Torero (1987), an ethnohistorian who utilizes 16th- and 17th-century documents to reconstruct the distribution of Aymara, Pukina, and Quechua, the three great *lenguas generales* of 16th-century Peru:

The presence of Aymaraes peoples (aymará-speakers) in the Collao and Charcas was relatively recent in the 16th century having arrived three centuries before, apparently in a violent manner, by military conquest advancing from the north toward the southeast along the Cordillera Occidental of the Andes and appropriated for themselves the altiplano territory possibly in the form of diverse señoríos or kingdoms, some of which are mentioned by Ludovico Bertonio in the introduction of his *Vocabulario de la lengua aymará* . . . (Torero, 1987, p. 339)

The broad outlines of Torero's (1987) principal conclusion, that the Aymara are recent immigrants, are accepted by other linguists and anthropologist, such as Bouysse-Cassagne (1987), Shady Solis (1987), and Wachtel (1987). With the exception of Shady Solis, however, each of these scholars explicitly argues for a *southern* origin of the Aymara, and not from the north as does Torero.

⁹ Hyslop's survey (1976, p. 11) was purposefully non-intensive, although systematic, in order to achieve the broadest coverage possible within the project constraints. As a result, a substantial number of sites were not recorded.

⁷ Whether such accounts are based on actual events or reflect deeper structures of Andean political ideology is highly debated. What is certain, however, is that a political entity known as the Lupaqa figured prominently in the oral histories of Tawantinsuyu, as related by Inca and Lupaqa elite to the Spanish chroniclers.

⁸ The Chucuito area has been surveyed by one of us (Frye) as part of a dissertation project. His work promises to provide substantial insight into the nature of this area.

The basis of Torero's (1987) model is the reconstruction of the distribution of indigenous languages in the region for the immediate pre-Inca periods. Pukina, a now-extinct language of the south-central Andes, was distributed throughout the Omasuyus area to the east and in the north and extreme northwest Titicaca Basin. This area corresponds to the Collas Urqusuyu and Collas Umasuyu cultural divisions. A corroborating observation for this immigration hypothesis is that highland Aymara lacks much dialectical differentiation. Albó (Albó, 1987, p. 377) notes that this fact supports a model of the recent origin of this language in the area.

The significance of this debate for archaeological research in the Juli–Desaguadero area is profound. The study area lies in the heart of the 16th-century Aymara language distribution. If the majority of linguists are correct, then our study area would be the point at which the original Aymara entered the Titicaca Basin, essentially avoiding the hypothetical Pukina-speaking Tiwanaku and Colla peoples to the south and north, respectively.

The Expansive Inca Period (A.D. 1450–1532)

The Inca Empire represents the one of the great empires of the ancient world. Thanks to the documentary evidence collected in the 16th century, there is detailed knowledge of Inca polity, economy, society, and ideology (e.g., the classic work of Rowe, 1947, still stands as one of the definitive works). The Titicaca Basin was the demographic and cultural center of the Inca quarter known as Collasuyu. A detailed account of the Inca conquest of Collasuyu can be found in the histories of Cobo (1956[1653]) and Cieza de León (1959[1553]). Although the accounts vary in specific details, a basic outline of the events of the conquest can be assembled. According to these histories, the first incursion into the Titicaca region was initiated by an early emperor known as Viracocha Inca, most likely in the middle of the 15th century. Viracocha Inca encountered the two large, powerful polities in the western Titicaca Basin—the Lupaqa and Colla—along with a number of smaller political groups such as the Canas, Cachi, Pacajes, and the Omasuyus (Fig. 5).

The Lupaqa and Colla were bitter enemies, engaged in nondecisive conflict. The Inca negotiated with both sides, trying to manipulate them for his own political advantage (Cieza de León, 1959[1553], pp. 215–216). Fearing the alliance

between the Lupaqa and the Inca, the Colla initiated a great battle with the Lupaqa at the town of Paucarcolla (Cieza de León 1959[1553], p. 219). The Lupaqa won this battle, and their “king,” known as Cari, returned to Chucuito and negotiated a peace with Viracocha Inca. The best interpretation of these histories is that Viracocha Inca actually lost in his bid to directly control the Titicaca region south of the Colla area and had to settle for an alliance with the Lupaqa. At this point, the emperor Viracocha did not establish actual political control over the Titicaca region, but the Inca state was clearly established as the dominant power in the region.

The histories indicate that the actual military incorporation of the region was accomplished by the later emperor Pachacutiq. Pachacutiq is said to have firmly brought the Titicaca Basin into the Inca orbit about one generation later (Cieza de León, 1959[1553], pp. 232–235). He initiated a new campaign and was forced to fight the Colla again. Cobo (1956[1653]) relates that the Colla fought and lost a battle with the Inca near the town of Ayaviri. The Colla retreated to the town of Pucara while the Inca destroyed Ayaviri, killing most of the population (Cieza de León, 1959[1553], p. 232).

Cobo then relates that the Lupaqa “received the Inca in peace and turned over his state to him. Thus the Inca honored him very much and in order to show him more favor, he stayed in Chucuito for a few days” (Cobo, 1956[1653], p. 140). Cieza de León varies this account slightly, suggesting that all principal polities in the Titicaca area accepted the Inca authority (Cieza de León, 1959[1553], p. 236). What seems clear from the documentary sources is that in this second military campaign under Pachacutiq, the entire Titicaca region was brought under Cuzco control.

The Early Spanish Colonial Period (A.D. 1532–1700)

The first incursions into the Titicaca region by the Spanish conquerors took place after the conquest of Cuzco (Bouysse-Cassagne, 1987, p. 27). Francisco Pizarro sent three men to investigate the Titicaca region after his forces consolidated control in the central highlands. The expedition arrived at the lake on July 15, 1534, and left an eyewitness account of the area. Spanish authorities divided the conquered territories in 1534. The conquest, however, was not immediate, and there

was a period of several years in which indigenous authorities were politically autonomous. As late as 1538, for example, the Lupaqa were able to mount resistance to Pizarro's army of 200 Spanish and a number of indigenous troops at the bridge at Desaguadero (Bouysse-Cassagne, 1987, p. 27).

Pizarro's death in 1540 and the civil war delayed extensive Spanish occupation of the region. The year 1545, however, marked a watershed for the Spanish colonial occupation. At this time, the rich mines of Potosí were discovered (Bouysse-Cassagne, 1987, p. 31). Although metal extraction was an important component in the Inca political economy, it was absolutely essential to the Spanish one. Cities were founded in the mining areas, and the progressive impoverishment of Titicaca began, as people and resources were shifted to the south. The founding of La Paz in 1548, for instance, represents such a shift. In spite of these

changed political and economic circumstances, the Spaniards could not ignore the huge populations of the Titicaca area, nor could the rich camelid herds and tuber agricultural productivity be abandoned. Substantial settlements were established on earlier Inca sites, and the Titicaca region became one of the major demographic centers of the Spanish colonial occupation.

The Early Spanish Colonial occupation in the Juli–Desaguadero region was extensive. The modern town of Juli was one of the most important centers of political and religious life of the Spanish American Empire south of Cuzco. Juli was originally a Dominican stronghold that was quickly taken over by the Jesuits. It is one of the great Lupaqa *cabeceras* listed in the Garci Diez de San Miguel *Visita* (Fig. 6). The town of Juli itself is home to four huge Colonial churches, a testimony to the early importance of this town.

Methodology of the Juli-Desaguadero Survey

The entire combined study area includes three zones: the Juli-Pomata intensive survey area, the Ccapia reconnaissance area, and the Desaguadero River reconnaissance area. The intensive survey methodology differed from that in the reconnaissance areas.

Methodology in the Juli-Pomata Intensive Survey Area

The Juli-Pomata intensive survey area lies along the lake between the Ilave Pampa in the north and the pampa directly south of Pomata. The northern end of the survey zone ended at the obvious landmark and cut stone steps seen in Figure 8. The total full regional coverage survey area is approximately 360 km².¹⁰ We surveyed along the lake shore and sampled the *puna* region in the Pasiri region.

A pedestrian survey was conducted according to standard archaeological methodology for arid lands, as has been successfully utilized in Mesoamerica and the central Andes. With a few exceptions, the settlement survey was intensive and systematic (100%). That is, the crew walked over the entire landscape and recorded all archaeological remains. The exceptions included a military base near Pomata, for obvious security reasons. We also did not survey near modern cemeteries, *capillas*, or *apachetas* out of respect for the religious sentiments of the local people. We likewise did not go inside modern house compounds without permission. Finally, the extreme eastern block of survey bordering the Lampa Pampa was not intensively surveyed. We located a few sites in this pampa, and we noted the existence of at least 70 more that we were unable to map or collect.

The reason for this is that the section entered a new administrative district (Yunguyu) here, and we did not have permission from the local authorities for an intensive survey. We were able only to conduct some limited reconnaissance on private land.

Crews of three to four persons walked between 10 and 25 m apart over the entire landscape, locating sites. All ceramic period sites were located on topographic maps, and detailed data were recorded on a standardized field form. Nonceramic period sites were recorded as well, but our survey most likely missed some Archaic lithic scatters without projectile points or obvious lithic diagnostics. A sketched map was then often made on the reverse side of the field form. Most sites were surface collected, utilizing a "grab-bag" methodology with a conscious attempt to gather a representative sample. We are very confident that we recorded all extant ceramic period sites in the survey area.

Prior research had established a basic ceramic chronology for the region (Bennett, 1934; Tschoepik, 1946; Rydén, 1947, 1957; Hyslop, 1976; Ponce Sanguines, 1981; Chávez, 1988a; Albarra-cin-Jordan & Mathews, 1990). This chronology allowed us to make a preliminary field assessment on the field form and a final assessment, based on careful examination of the collections, in the laboratory. The collections usually contained at least a dozen diagnostic sherds, and virtually all of the major sites produced several dozen diagnostics.

Each bag from each site was curated as a site-specific collection unit, as opposed to the creation of type collections for ceramic studies. This permitted us to continually recheck the collections to verify the phasing of the sites. The principal investigator, Stanish, examined each collection many times over the last several years. In one instance, for example, Steadman identified an Upper Formative plainware that had not been recognized prior to 1992. As a result, we went back

¹⁰ Due to the lack of standardized maps and some variation in scale on the available maps, there is a small error in the calculation of our total survey area.



FIG. 8. North end of survey zone with cut stone.

through each bag to check for this type of ceramic, a process that also allowed us to verify and recheck earlier site phasings as well. Furthermore, Stanish, Frye, Onofre, Seddon, Calisaya, and de la Vega have revisited many of the sites on the survey. In most instances, additional collections were made if there was some doubt as to the representativeness of the samples.

One of the most important observations in the survey was the size of each site (Tables 1 and 2). Site size was visually estimated during the survey by each crew. When a site was discovered, the entire crew would stop and begin collecting and/or recording data. The crew chief would record the information on the field form while the rest of the crew would fan out and make artifact collections. The crew would then define the limits of artifact and/or architectural concentrations. The crew chief would then pace off or estimate the size of the site area and record it as an areal measurement, such as "50 × 75 meters."

A classic problem in settlement archaeology is the definition of a site, and there is the constant danger that the way in which the settlement data are collected can bias interpretations. In the very dry lower and middle sierra of the Andes, this is

usually not a problem. Sites tend to be geographically discrete and are defined by heavy artifact and/or architecture concentrations. In the Titicaca Basin area, however, the question of where to define site limits is more of a problem. In many cases in the study area, the definition of a site was relatively unambiguous—a site was a contiguous concentration of archaeological remains that formed a coherent unit of some sort, be it a collapsed house structure, a ruined village, or a non-habitation feature such as a tomb. On the other hand, in the case of the low, terraced hills near the lake, there is a very high density of artifactual remains, with little standing architecture. Crew chiefs had to make the decision as to whether to lump a number of artifact concentrations into a single site and collect from separate areas within the site or to collect each concentration as a single site. Furthermore, we had to decide whether to include isolated cemetery areas as part of a single settlement or to categorize them as individual sites with single collection areas. This is why the site size data are so important. Theoretically, the collection of site area data should cancel out any subjective differences between crew chiefs in defining sites. For example, a hillside with artifact con-

TABLE 1. Habitation site sizes (in hectares) from the Middle Formative to the Early Colonial periods in the Juli-Pomata intensive survey area.*

Site No.	Period†						Type
	EC	LH	ALT	TIW	UF	MF	
001	3.00	3.00		5.30	4.00	2.50	1/8
002	20.00	20.00					7
003		1.00	5.00				4/5
004	5.00	5.00					7
009	2.00	2.00					7
011	2.50	2.50					4
012			0.04				4
013		0.25					6
014		0.08					6
017	1.50	1.50					4/8
018	0.04	0.04					4
021		0.06					4
022						0.90	4
023			2.00				4/5
024		0.50?					4/8
025		0.02	0.02?				4
026	0.04	0.04					4
027	0.13	0.13					4
028	4.00	4.00					4
029	0.04?	0.04?	0.04?				4
030	0.12?	0.12?					4
031	0.15	0.15					4
032	0.15	0.15	0.15				4
033	0.02	0.02					4/8
034	0.02	0.02	0.02				4
035	0.04	0.04					4
036	0.08	0.08					4
037		0.25?	0.25?				4/8
038	0.20						4
040		0.08					4
041	0.04	0.04	0.04				4
042	0.09	0.09					4/8
045	0.15	0.15					4
046		0.12?					4
047	0.02						4
048	1.00	1.00					4
049	0.28	0.28					4
050	0.09?	0.09?					4
051	0.15						4
052	0.25	0.25	0.25				4/8
053	0.04						4/8
054	0.06	0.06	0.06				4
056	0.12	0.12					4/8
057	0.04	0.04					4
058	0.40	0.40	0.40?				6
060	3.00	3.00					4
061	0.12	0.12					4
062	0.04	0.04					4
063		0.04					4
064	1.00						4
065	0.05	0.05					4/8
067	3.00	3.00					4/8
070	0.08	0.08					4/8
073	0.56	0.56					6
074	0.30	0.30	0.30				4/8
075	0.03	0.03					4
076		0.08					4
077	4.00	4.00					4
078	0.02						6

TABLE 1. Continued.

Site No.	Period†						Type
	EC	LH	ALT	TIW	UF	MF	
079			0.04?				4
080	0.20						4
081	0.02	0.02					4
082	1.00	1.00	1.00				4
083	0.05	0.05					4
084	0.12	0.12					4
086	0.06	0.06					4
088	0.02	0.02					4
089	0.09						4
091		0.12					4
092	0.06	0.06					4
093			0.03				4
096		0.14	0.14	0.14			4/8
097		0.09	0.09				4/8
098	0.03	0.03					4
099		0.15					6
100	0.25						4/8
103	2.00	2.00	2.00				4/8
104	0.20	0.20	0.20				4
105		0.25					4
107	2.00	6.00					4
111			0.13				6
112	0.25	0.25					6
113		0.25		0.25		0.25	2/4
114		1.00					4/8
116	2.00	8.00	4.00				6
119	6.00	6.00					4
120			0.80	0.80			4
121	1.00	1.00	0.50	4.00			3
122	0.15	0.15	0.15				4
123	0.25	0.25					4
125	0.08	0.08					4
127	0.04	0.04					4
128	0.12						6
129	0.06	0.06					4
130		2.00					4
131							9
133				0.01	0.01	0.01	4/8
134	3.00						4
135	0.01	0.01					2/8
136	0.06	0.06?	0.06	0.06			12
137		1.00		1.00			4
138	0.25	0.25					2
140	0.06	0.06					4/8
141	0.07	0.07					4
142	0.10	0.10					4/8
143			0.16				4/8
144		0.25					4
145	0.06	0.06					4
146	0.16	0.16?					4
147				0.15			4
148	0.04	0.04		0.04			4/8
151	0.25	0.25	0.25				4
153	0.04	0.04					4
158				3.50	2.00	1.00	3/8
160	0.25	0.25	0.50	0.50			4
161	0.01?						2
162		0.01?					2/8
163	0.04						2

TABLE 1. Continued.

Site No.	Period†						Type
	EC	LH	ALT	TIW	UF	MF	
167	0.06					4/8	
168	0.06					4/8	
169	2.00					4	
170	0.04					4	
171	0.06	0.06				4	
173	0.05					4	
175	0.56	0.56					4
176		0.02					4
179	0.02	0.02?			0.02		4/8
181	0.16	0.16					4/8
185		4.00					4/8
188	0.09		0.09?				4
190		3.00					4/8
192		0.04?	0.04?				4
194	0.02						4/8
195	0.04?						5
197	0.03						4
202	0.25						4
205	2.25?	2.25?					3/8
206	0.09						4/8
207	0.06	0.06					4
208	0.06	0.06	0.06	0.06	0.60	0.06	2
209	0.25	0.25	0.25				2 or 6
210				1.50	1.50	0.50	1
212		1.00	1.00	12.00	10.00	4.00	3/8
213			0.25				4/8
216	0.01	0.01?					2
217	0.09						2
218		0.25					2
219	0.04						2
220			0.04		0.04	0.04	2
221	2.00	2.00	2.00				2
222	0.01?	0.01?	0.01?				2/8
223	0.01	0.01?	0.01				2
224	0.25		0.25				2/8
226			0.50				12
227	0.50	0.50					2
228			0.04		0.04		2
229	0.04?	0.04	0.04?				6
230			0.05				2/8
231			0.01				2/8
232			0.25				12
233			0.50				2/8
234		0.03	0.03				2
235		1.00	1.00				2/8
236	1.00	1.00	1.00		1.00		4/8
237			0.01				2/8
240		0.07	0.07				2/8
241	0.01	0.01	0.01				2
242	0.04	0.04	0.04				2
243	0.49		0.49				2/8
244			0.02				2/8
246			0.01				2
247			0.01				2
248			0.03				2/8
252		0.04					2 or 6
255	0.10	0.10					4
257	0.06						4

TABLE 1. Continued.

Site No.	Period†						Type
	EC	LH	ALT	TIW	UF	MF	
258		1.00	1.00	1.00			4
261		0.30	0.30?	1.00		1.00	4
262	0.50						12
264	0.06						4
271				0.04			2/8
272		0.10	0.10				2/4/8
276		1.00					4
277	0.01						4
278	0.25					0.50	4
282		0.04					4
284			1.25	1.25			1/8
286	0.25	0.25					4/8
287	4.00	4.00	4.00				4/8
288	0.25	0.25	0.25				4/8
289	0.12	0.12	0.12				4
290	0.75		0.75				4/8
291	2.50?	2.50?					4
292	0.20						6
293	0.02	0.02					4
294	0.25	0.25	0.25				2/8
295	0.04	0.04?					4/8
296	0.09						4
297	0.12	0.12					4
299	0.25	0.25	0.25				4
300	4.00	4.00					4/8
301	0.03	0.03	0.03				4
302	1.00	1.00					2/6/8
303			0.04				4/8
304	1.00	1.00					4
305	0.01	0.01					4/8
306		1.00	1.00				4
307	1.00	1.00	1.00				4/8
308	1.00	1.00					4
310		0.04	0.04				8/12
312	1.00		1.00				4/8
313	0.50	0.50	0.50				4
314	0.25						4/8
315	0.25	0.25					4
317	2.00	2.00					4
318	0.04	0.04	0.04				4/8
319	0.12	0.12					4/8
320	0.25	0.25	0.25				4/8
321	0.50					0.50	4/8
322	0.25	0.25					4
323	2.00	2.00	2.00				4
324	1.00	1.00					4
326	0.04	0.04?					4
237			0.18	0.18			4
329		0.25?	0.25?				4
330	0.04	0.04					4/8
331	0.40	0.40					4/8
332		0.35	0.35				4
333			2.00	2.00	2.00	2.00	4/8
334	0.02						4
335	0.02						4/8
336		2.00	2.00	2.00			4
337	1.00	1.00	0.50				4
338		0.20					4
339			0.01				2
340	0.25	0.25					4

TABLE 1. Continued.

Site No.	Period†						Type
	EC	LH	ALT	TIW	UF	MF	
341		1.00		1.00			4/8
342						2.75	4
343		0.06					4
345		0.20		0.20			6
346	0.25	0.25	0.25				2
347		1.00	1.00	1.00	1.00	1.00	4
348	0.25	0.25	0.25				4
349			1.00	1.00	1.00	1.00	4/8
350	1.00	1.00					4
351	0.50	0.50	0.50				4/8
352	0.25	0.25					4
353	5.00	5.00?					4
355	0.04	0.04	0.04				4
357	1.00	1.00					6
358	0.04	0.04					4
359		0.15					4
360		0.25					4
361		0.04?	0.04				4
362	0.09	0.09	0.09				4
365	1.50	1.50		1.50	1.50	1.00	4/8
367		0.02?					4/8
372	0.01	0.01	0.01				4/8
373						0.25	4
376	0.15						4
377	0.04						4/8
378	0.02	0.02					4
379	3.00?	3.00					4/8
380	0.04						4
381		0.50					4
382			0.06?				4
383	0.50	0.50	2.00	2.00	2.00	1.00	4
384	0.50		0.50				4/8
385		1.00					4
387	1.00	1.00					4/8
388			1.00				4/5
389	0.60	0.60					4/8
390	0.01	0.01	0.01				4/8
392	0.16	0.16					4/8
393			0.02				4/8
395	0.01	0.01					4/8
396	0.50	0.50	0.50	1.00			4/8
399			0.25	0.50			4
401	1.50		1.50				4
403		0.48					4/8
404	0.70	0.70	0.70				4/8
405			0.12				4/8
406	0.12	0.12					4
407	0.25	0.25					4
408	0.03	0.03					4
409	0.16		0.16				4/8
410	0.15?	0.15?	0.15?				6/8
411	0.09	0.09		0.09			4
412	0.25						4
415		0.30	0.30				4/8
417		0.35					4
418		0.16	0.16				4/8

TABLE 1. Continued.

Site No.	Period†						Type
	EC	LH	ALT	TIW	UF	MF	
419		0.49		0.49			4
420		0.04	0.04				4/8
421		0.50		0.50			4
422		1.00		1.00	1.00	0.50	4
423	0.15	0.15	0.15?				4
425	1.00	1.00	1.00				2/8
426	0.49		0.49				2/8
427	0.04	0.04					4
428			0.04				2
429	0.06	0.06	0.06				2
432	0.25	0.25?					4
433	0.28		0.28				4
434	0.50						4/8
436	0.04	0.04					12
437	0.25	0.25	0.25				4/8
438	0.25	0.25	0.25				6/8
439	0.09	0.09					2
440	0.09	0.09	0.09				2
441			0.01		0.01		2/8
442		0.04					2
443	0.30	0.30	0.30				2/8
444		1.00		1.00			1
445		4.00	4.00	5.00			2/3/8
446		2.00	2.00				4/8
447			1.00				3
448			1.50				3
449	2.00	2.00					2
450			0.25			0.09	2/8
451		0.09	0.09			0.09	2/8
452		1.00	1.00		1.00		4/8
453			0.25				8/?
454	0.25?	0.25	0.25	0.25			3/8
455		1.50		4.00			3
456			0.02				4/8
457			2.00	5.00	4.00	2.00	4
458	0.50						6
460		0.25					4
461		0.25					4
463	2.25						4
464	0.06?	0.06					6/8
466	4.00						4
467			0.15?				4
469	0.25						6
471	0.15						4
472	0.35	0.35					6
473			0.20				6
474	2.25	2.25					6/8
477	4.00		1.00				4/8
479	0.15?						4
481			0.50				4/5
495	0.15						4/6
496	1.00	1.00					6
499						0.05	11
500	0.05	0.05		0.05		0.05	11

* Several sites were combined or eliminated after laboratory analysis. The site registry numbers assigned to these sites were therefore discarded.

† EC, Early Colonial; LH, Late Horizon; ALT, Altiplano; TIW, Tiwanaku; UF, Upper Formative; MF, Middle Formative.

centrations that extend over an area of 300×500 m could be considered one site with separate collection areas, for a total of 15 ha of habitation area, or it could be divided into three sites of 5 ha each, for a total of 15 ha. In terms of total habitation area, the site size estimates helped to standardize differences between crew chiefs.

The problem became more complex when we discovered sites with multiple occupations. If only one of the artifact concentrations in the example above had an early occupation, but the crew chief categorized the entire 15 ha as a single site, then this early occupation could potentially be reported as covering 15 ha when in fact it covered a much smaller area. The problem of multiple occupations on sites was a major hindrance to site size definition in the survey.

We dealt with this problem in a comprehensive manner. First, the crew chiefs were instructed to favor the splitting of sites and to use separate site designations liberally, as opposed to the lumping of site areas. Second, Stanish personally visited and revisited all major sites, and many minor ones, over the course of several field seasons. Changes were made where necessary, and this process served to standardize the final reporting. In a number of instances, for example, sites originally defined as a single, large occupation were broken up into smaller ones, new surface collections were made, and the sites were given new catalog numbers. Likewise, sites that had multiple occupations were intensively investigated to assess the extent of those occupations well after the initial survey was complete and after our ceramic chronology had been defined. We were able to define fairly precisely the limits of each occupation by period, with extensive walkovers. These walkovers simply involved spending considerable time on a single site, isolating the distribution of chronological diagnostics on that site. The distribution of the sherds permitted us to define the total area of site occupation per period by measuring the area of the distribution of each chronological diagnostic.

The data indicated that Late Horizon and Early Colonial sites were very similar in distribution and size, and that they tended to not have earlier occupations. In general, we did not have great difficulties in defining the total habitation area of each period of these sites. The large Tiwanaku and Late Sillumocco sites, in contrast, tended to have a fair amount of Late Horizon and Early Colonial pottery that was concentrated in very small areas, indicating that the former elite/ceremonial

site areas were used later in a manner more like that of squatter sites. Furthermore, the pre-Altiplano Period sites were relatively few in number, and the ceramic distributions of Early Sillumocco, Late Sillumocco, and Tiwanaku Period diagnostics tended to be spatially concentrated, with easily defined limits. Altiplano through Early Colonial Period sites were more dispersed, but they were also rarely mixed with pre-Altiplano Period occupations. Consequently we developed a substantial database of site size per period. These site size data were therefore superior for defining population changes and patterns of land use through time.

Site Sizes

In the field, site size was estimated by pacing off the area of artifact distribution. For example, the field form contains an estimate in meters, such as “ 100×150 meters.” For descriptive purposes, we occasionally use the terms “hamlet,” “village,” and “center.” “Hamlet” is meant to convey the idea of a small, domestic site located near or adjacent to agricultural or pastoral fields. By our criteria, a hamlet is less than about 0.2 ha in size and corresponds to modern household clusters, as seen in Figure 9. Aboriginally, hamlets were composed of one to several households. By analogy to ethnographic data, we may presume that the households in a hamlet were composed of extended families. The term “village” is meant to convey the idea of a larger concentration of households, populated by both related and non-related families. Population centers represent the largest concentration of people in the Juli–Pomata area. The term “center” was chosen because it is relatively neutral in meaning. We consider an area greater than 4.0 ha in size to be a population center. Large hamlets, small villages, and villages fall between these two figures of 0.2 and 4.0 ha.

The population estimates (Table 3) for the Juli–Pomata region provide excellent quantitative data on the relative and absolute importance of the three main areas of economic land use per period: (1) the raised-field areas, including areas of relict fields and their periphery within 1 km; (2) the non-raised-field areas below 4000 m, referred to as the non-raised-field *suní* and representing the optimal location for rain-fed terrace agriculture; and (3) the high-altitude camelid pasturelands above 4000 m.a.s.l., known as the *puna*.

As noted above, sizes for each of the sites iden-

TABLE 2. Cemetery sites in the Juli–Pomata area.

Site No.	EC	INCA*	ALT	TIW	UF	MF	Type	Name
001	x	x		x	x	x	1/8	Tumatumani
017	x	x					4/8	Chinchin Jalave
020	x	x					8	T'Ajsat Parqui
024		?					4/8	Unnamed
033	x	x					4/8	Unnamed
037		?	?				4/8	Unnamed
039	?						8	Unnamed
042	x	x					4/8	Unnamed
043	?	?					8	Unnamed
044		?					8	Unnamed
052	x	x	x				4/8	Unnamed
053	x						4/8	Unnamed
055	x						8	Unnamed
056	x	x					4/8	Unnamed
059		x					8	Unnamed
065	x	x					4/8	Unnamed
066		x					4/8	Unnamed
067	x	x					4/8	Becerapai
068	x	x	x				8	Unnamed
069		x					8	Unnamed
070	x	x					4/8	Unnamed
071	?		x				8	Unnamed
072			x				8	Unnamed
074	x	x	x				4/8	Unnamed
087		x					8	Unnamed
090	x	x					8	Chullpa Cerro
094		x	x				8	Wila Ponko
095		?	?				8	Unnamed
096		x	x	x			4/8	Sanchi Puto
097		x	x				4/8	Luciniri
100	x						4/8	Churachocha
101			x				8	Unnamed
102		x	x				8	Unnamed
103	x	x	x				4/8	Kollini
106			x				8	Macatawi
108		x					8	Huerta Parque
109			x				8	Unnamed
110		x					8	Unnamed
114		x					4/8	Unnamed
117	x	x					8	Sector Ccayuchawi
118	x						8	Tiipata
126		x	x				8	Putuko Pata
132	x	x					8	Kentuyu
133				x	x	x	4/8	Casa de Chambilla
135	x	x					2/8	Escuela Chocasuyu
139		x					8	Unnamed
140	x	x					4/8	Lloconocco
142	x	x					4/8	Unnamed
143			x				4/8	Unnamed
148	x	x		x			4/8	Unnamed
149		x	x				8	Unnamed
150	?	?					8	Unnamed
152	x		x				8	Chucuni
154	x						8	Unnamed
155		x	x				8	Unnamed
156	x		x				8	Wila Amaya
157		x	x	?			8	Misquich Pongo
158		x		x	x	x	3/8	Sillumocco–Huaquina
159	x	x	x				8	Unnamed
162		?					2/8	Unnamed

TABLE 2. Continued.

Site No.	EC	INCA*	ALT	TIW	UF	MF	Type	Name
164			x		x		8	Unnamed
165	?	x					8	Unnamed
166		x	x				8	Kawasinte
172		x					8	Caracollo
174			x				8	Chulpa Yakuti
177			?				8	Unnamed
178	x	x					8	Wicha Pata
179	x	?			x	x	4/8	Unnamed
180	x						8	Cruz pata
181	x	x					4/8	Unnamed
182	?						8	Sonoko
183		x					8	Unnamed
184		x					8	Unnamed
185		x					4/8	Unnamed
186		x	x				8	Unnamed
187	?		x				8	Puluituni
189	x	x					8	Unnamed
190		x					4/8	Naino Jaque
191		x					8	Unnamed
193		x					8	Unnamed
194	x						4/8	Unnamed
196	?	?	?				8	Unnamed
198	?	?	?				8	Guitarani
199	?	?	?				8	Unnamed
200	?	?	?				8	Unnamed
201		x	x				8	Unnamed
203	x	x					8	Pisac Pujo
204	?	?					8	Sullijicani
205	?	?					3/8	Unnamed
206	x						4/8	Palmore
211	x						8	Kjahuma
212		x	x	x	x	x	3/8	Palermo
213	x		x				4/8	Unnamed
214	?		?				8	Unnamed
215	x	x	x				8	Unnamed
222	?	?	?				2/8	Unnamed
224	x		x				2/8	Unnamed
225	x						8	Unnamed
230			x				2/8	Gintilipata
231			x				2/8	Unnamed
233			x				2/8	Unnamed
235		x	x				2/8	Carpayu
236	x	x	x		x		4/8	Unnamed
237			x				2/8	Unnamed
238			x				8	Unnamed
239			x				8	Unnamed
240		x	x				2/8	Unnamed
243	x		x				2/8	Palermo Pampa
244			x				2/8	Unnamed
245		?	?				8	Unnamed
248			x				2/8	Kauya Punko
249		x					8	C'Amac Apacheta
250		x	x				8	Unnamed
251		x	x				8	Tisnachuro
253		?	x				8	Unnamed
254	x	x	x				8	Phifuta
256	x	x	x				8	Kirinusu
259			x				8	Unnamed
260		x					8	Unnamed
263		?	x				8	Chaulanuyo
265		x	x				8	Khutipata

TABLE 2. Continued.

Site No.	EC	INCA*	ALT	TIW	UF	MF	Type	Name
266			x				8	Unnamed
267			x				8	Pampa de Pucara
268			?				8	Unnamed
269			x				8	Unnamed
270	?	?	x				8	Unnamed
271				x			2/8	Anko Ake
272		x	x				2/4/8	Unnamed
273	x	x					8	Unnamed
274		x	x				8	Unnamed
275		x					8	Patjata
280			Unknown				2/8	Unnamed
281		x					8	Unnamed
283			x				8	Unnamed
284	x		x	x			1/8	Unnamed
285	x	x					8	Morohawi
286	x	x					4/8	Maurijawi
287	x	x	x				4/8	Unnamed
288	x	x	x				4/8	Unnamed
290	x		x				4/8	Unnamed
294	x	x	x				2/8	Unnamed
295	x	?					4/8	Morjoaua Chamacuyu
298	?	?	?				8	Unnamed
300	x	x	x				4/8	Unnamed
302	x	x					2/6/8	Unnamed
303			x				4/8	Unnamed
305	x	x					4/8	Unnamed
307	x	x	x				4/8	Unnamed
309			x				8	Unnamed
310		x	x				8/12	Palluni
311			x				8	Calataqui
312	x		x				4/8	Unnamed
314	x						4/8	Palyuma
316			x				8	Unnamed
318	x	x	x				4/8	Tocone
319	x	x					4/8	Unnamed
320	x	x	x				4/8	Unnamed
321	x				x	x	4/8	Tihuta
325	x		x				8	Tonkoni
328	x						8	Unnamed
330	x	x					4/8	Chiapata
331	x	x					4/8	Unnamed
333			x	x	x	x	4/8	Hanco Vilque
335	x						4/8	Unnamed
341		x		x			4/8	Unnamed
344	x	x					8	Unnamed
349			x	x	x	x	4/8	Unnamed
351	x	x	x				4/8	Unnamed
354	x						8	Unnamed
356		x	x				8	Unnamed
363			x				8	Unnamed
364		x	x				8	Unnamed
365	x	x	x	x	x	x	4/8	Unnamed
366		x	x		?		8	Cutipatac
367		?					4/8	Unnamed
368		x	x				8	Huallatani
369			x				8	Pharuyo
370			x				8	Anatave Pacca
371		?	x		x		8	Unnamed
372	x	x	x				4/8	Unnamed
374	x						8	Achocallani Parque
375		x	x				8	Aceruni Amaya

TABLE 2. Continued.

Site No.	EC	INCA*	ALT	TIW	UF	MF	Type	Name
377	x						4/8	Challchaque
379	?	x					4/8	Unnamed
384	x		x				4/8	Unnamed
386	x	x					8	Hanco Amaya
387	x	x					4/8	Unnamed
389	x	x					4/8	Cumbre Kenco
390	x	x	x				4/8	Unnamed
391		x	x				8	Unnamed
392	x	x					4/8	Kallpuma
393			x				4/8	Unnamed
394		x					8	Kenco Pacca
395	x	x					4/8	Unnamed
396	x	x	x	x			4/8	Pichuña
398	?						8	Unnamed
400			x				8	Anco Amaya Pata
402	x	x	x				8	Tiapichuro Ponco
403		x					4/8	Mogote
404	x	x	x				4/8	Unnamed
405			x				4/8	Unnamed
409	x		x				4/8	Moccocollo
410	?	?	?				6/8	Unnamed
413							8	Totora Cota
414	x						8	Unnamed
415		x	x				4/8	Siguia Jawira
416	x	x	x				4/8	Unnamed
418		x	x				4/8	Caracachi
420		x	x				4/8	Unnamed
424	?	?	?				8	Unnamed
425	x	x	x				2/8	Unnamed
426	x		x				2/8	Unnamed
430		x					8	Isca Yaureca
431		x					8	Marca Pampuyo
434	x						4/8	Unnamed
435	x						8	Yaureca
437	x	x	x				4/8	Siquijaque
438	x	x	x				6/8	Inka Samaña
441			x		x		2/8	Unnamed
443	x	x	x				2/8	Unnamed ₁
445		x	x	x			2/3/8	Unnamed
446		x	x				4/8	Chochoni
450			x				2/8	Willacollo
451		x	x		?	x	2/8	Koskanki
452		x	x		x		4/8	Kjoroskani
453			x				8/?	Unnamed
454	?	x	x	x			3/8	Istuyo
456			x				4/8	Unnamed
459	?	?	?				8	Unnamed
464	?	x					6/8	Belena
465	x						8	Unnamed
470	?	?	?				8	Pairumani
474	x	x					6/8	Patapjuo
476			Unknown				8	Unnamed
477	x		x				4/8	Unnamed
480	x		x				8	Unnamed
482	x		x				8	Unnamed
484	?	?	?				8	Unnamed
485	x		x				8	Unnamed
486	?	?	?				8	Unnamed

* INCA indicates the Inca Period. Other abbreviations are as in the footnote to Table 1.



FIG. 9. Example of site type 2.

tified in the Juli–Pomata survey were assessed in the field as an absolute areal measure. We presume a general proportional relationship between site size and population that is constant for all periods. This assumption is almost certainly valid for most of the rural sites that were characterized by simple domestic terracing on low hillsides. Domestic terraces constituted the vast majority of the sites in the survey. This assumption is admittedly questionable for elite administrative sites, where densities were probably higher. However, any adjustment for higher densities on these latter sites would only moderately accentuate the population patterns and not significantly alter any trends in the data.

Another potential problem with this methodology is the large and different time blocks represented by each period. This, of course, would skew population estimates when utilized to analyze patterns *between* periods. In other words, although the estimates work well when land use is compared *within* a specific time period, we would have to calibrate the population estimates when they would be used to compare between periods. This is why we use relative population distribution, as indicated by total site area, for intraperiod

comparisons. For comparing population sizes between periods, we have to adjust for the time differences of each period. This problem is addressed below, in the discussion of population growth.

Large sites with multiple occupations constitute an additional problem for assessing site size per period in survey methodologies. Accordingly, our method was to conduct intensive walkovers to determine the extent of site size per period. We were able to ascertain the approximate distribution of the pottery diagnostics on the site and calculate the total area per period. This method provides an accurate assessment of the occupation area for each site by period.

The distribution of sites in different areas of the survey zone allows us to define the relative importance of economic activities for each period. The *puna* zone is ideally suited for camelid pasturing and is only marginal for tuber cultivation. The raised-field zone is confined to the flat pampas inland from the lake and adjacent to rivers and is identified by the existence of relict fields. According to H. Tschopik (1951, p. 513) the flat pampas “away from the lake shore” are the poorest agricultural areas, as assessed by the contem-

TABLE 3. Population per period per ecological zone in the survey area.

Parameter measured	Period					
	Middle Formative	Upper Formative	Tiwanaku	Altiplano	Inca	Early Colonial
Total populated area (ha)	23.04	32.72	62.86	74.16	178.49	153.75
Total sites	25	19	41	140	242	224
Mean size of all sites	0.92	1.72	1.53	0.53	0.73	0.69
Total no. of sites in raised fields	11	12	17	44	48	43
Population index of raised-field zone (ha)	9.49	22.71	35.74	21.04	25.15	15.18
Mean size of sites in raised fields	0.86	1.89	2.10	0.48	0.52	0.35
Population index of raised fields as percentage of total	41	69	57	28	14	10
Total sites in non-raised-field <i>suni</i>	11	6	21	75	143	124
Population index of non-raised-field <i>suni</i> (ha)	10.20	8.01	24.53	42.64	118.62	99.89
Mean size of sites in non-raised-field <i>suni</i>	0.93	1.33	1.16	0.57	0.83	0.80
Population index of non-raised-field <i>suni</i> as percentage of total	44	24	39	57	66	65
Total sites in <i>puna</i>	3	1	3	21	51	57
Population index of <i>puna</i> (ha)	3.40	2.00	2.59	10.48	34.72	38.68
Mean size of sites in <i>puna</i>	1.13	2.00	0.86	0.50	0.68	0.68
Population index in <i>puna</i> as percentage of total	15	6	4	14	19	25

porary Aymara and confirmed by Stanish's observations. Accordingly, this area is agriculturally useful only with raised-field constructions, although the area is used for marginal grazing today. Today, it is also the principal zone of residential occupation. The non-raised-field terraced agricultural zones in the *suni* are considered by the modern Aymara farmers to have both the best agricultural potential in the absence of raised-field agriculture (valley bottoms in the hills) and moderate to poor potential (hillside fields) (H. Tscho-pik, 1951, p. 513).

What is significant here is that each of these zones provides specific and different economic opportunities. Of course, it is generally unrealistic to presume that there is a strict correspondence between residential location and economic activity, but the contemporary ethnographic data in the Titicaca region indicate that residence is an excellent predictor of the principal economic activity, given the ecologically specific economic opportunities in each zone. The total population in each zone, as derived by habitation area, provides an excellent characterization of land use during any particular period. In a recent publication, for

instance, one of us used these data to define the relationship between political centralization and raised-field land use through time (Stanish, 1994).

Ceramic Typology

The purpose of pottery classifications is best summarized by P. Rice: "most archaeological pottery typologies are devised classifications ... [used] primarily to standardize descriptions of artifacts, develop chronologies, and help with inter-site comparisons" (Rice, 1987, p. 288). Ceramic specialists are divided on the most appropriate classificatory methods, and it is safe to say that there is no "correct" system. The type-variety system is recommended by Sinopoli (1991, pp. 52–53), for instance, as the best method of classification. Rice notes that it is a powerful method, particularly when the "ware" concept is utilized as one level of classification. Rice successfully utilized a type-variety system to classify Spanish Colonial ceramics in the Moquegua Valley of the western valleys (Rice, 1990).

Rowe has argued against the use of types, at

least for chronological purposes (1959, p. 318). Similar reservations about the type concept have been suggested by Chávez (1980, p. 219). Rowe advocates the creation of styles: "The object is to write a sort of grammar of the style at a given moment in time" (1959, p. 323). In this light, the definition of style provided by Rice is most useful: "visual representations, specific to particular contexts of time and place, that at the least transmit information about the identity of the society that produced the style and about the situation or location where it appears" (1987, p. 244). Implicit in this definition is the notion that the styles are, at least in part, emically valid categories.

No generally accepted standards exist for describing and typing ceramic assemblages in the Titicaca region. One of us (Steadman) employed an attribute analysis method for our research at Tumatumani (001), a major site near Juli (Stanish & Steadman, 1994). This method works well with very large samples, such as those obtained from the Tumatumani excavations. For instance, in a relatively small excavation area, we obtained thousands of sherds. Such large sample sizes are simply not possible from nonsystematic surface ("grab-bag") collections used in survey. In fact, it would be almost unethical to collect such large samples from the surface of any single site without a very rigid surface sampling method, such as that employed at Tumatumani (001) and San Bartolomé-Wiscachani (022). As a result, we had to alter our typology to meet the specific goals of the survey. Our concern as settlement archaeologists is largely chronological. We sought diagnostic material that would date the sites and allow us to define settlement patterns for each period. To this end, we defined a number of types for the survey area that meet the principal goal of chronology building, but they can also be used for regional comparisons.

The typology that was defined is based on surface decoration, vessel form, and/or tempering materials. In other words, we define a particular type that reflects a coherent group of attributes that would most probably be recognized, both etically and emically, as a "style." It is important to note that the few types that we utilized represent a fraction of the various types that could be isolated, but the ones defined here were used to date the sites on survey. These types are summarized in Table 4.

More refined typologies will ultimately be constructed for the southwestern Titicaca region, depending on the types of questions to be asked and

TABLE 4. Diagnostic ceramic types used in the study area.

Early Formative Period
Pasiri Ware
Middle Formative Period
Early Sillumocco Plain
Early Sillumocco Qaluyu Incised
Early Sillumocco Qaluyu Polychrome
Early Sillumocco Chiripa Polychrome Incised
Early Sillumocco Chiripa Bichrome
Upper Formative Period
Late Sillumocco Plain
Late Sillumocco Polychrome Incised
Late Sillumocco Incised
Late Sillumocco Qeya Polychrome
Tiwanaku Period
Tiwanaku Black and White on Orange
Tiwanaku Black and White on Red
Tiwanaku Black on Orange
Tiwanaku Black on Red
Tiwanaku Plain
Tiwanaku Polychrome
Altiplano Period
Pucarani Plain
Pucarani Black on Red
Pucarani Black and White on Red
Pucarani Red on Orange
Pucarani Red on Brown
Pucarani Black on Orange
Sillustani Bichrome Bowls
Kelluyo Bichrome Bowls
Late Horizon Period
Chucuito Bichrome Bowls
Chucuito Polychrome Bowls
Local Inca Plain
Local Inca Polychrome
Local Inca Bichrome
Pacajes Bowls
Sillustani Bowls
Early Colonial Period
Chocasuyu Plain
Chocasuyu Bichrome
Chocasuyu Glazed

the nature of the sample. In general, the present typology will remain very useful for the general dating of the sites and some other analyses. Future work at particular sites will yield more refined typologies, such as those worked out by Steadman at Tumatumani (Stanish & Steadman, 1994). The hierarchical nature of the typology and the generally conservative convention used here should result in new typologies that are consistent with the present one but also yield a greater amount of information. In other words, the following typology is robust in that it will not be *replaced* with

future research, but may be refined and modified to answer more specific questions. An example is our classification of Expansive Tiwanaku ceramic types. At the present, we merely phase a site as Tiwanaku if it is dated between A.D. 400 and 1100. Excavations at a number of these sites should provide typologies with greater chronological control. They will also permit the definition of greater stylistic variability within contemporary periods (redefining the Bennett–Ponce chronology, for instance) and provide greater insights into contemporary social, political, economic, and ideological variability.¹¹

Methodology in the Reconnaissance Areas

Once our resources were nearly expended in the intensive survey area, we switched to a large-site reconnaissance strategy, east to Yunguyu and south to Desaguadero. This strategy was designed

to locate major sites in the Ccapia and Desaguadero areas. The methodology simply involved driving and/or walking to areas likely to have large sites. Likely areas were identified as low hills near the lake, elevated areas near raised-field areas, and higher locations on colluvial flanks near water sources. These criteria derived directly from our experience in the intensive survey area. The criteria also were weighted to find pre-Altiplano Period site locations. Although we did find a number of Altiplano through Early Colonial sites, we consciously sought out areas that were likely to have Tiwanaku and Formative Period sites.

The intent of the reconnaissance was to record large sites in the area and compare them to the intensive survey area. Furthermore, we sought to sample various geographical areas to test for settlement densities and types, including the discovery of smaller sites. These data permitted us to compare the Ccapia and Desaguadero areas with the systematically surveyed Juli–Pomata area.

Ideally, we would like to continue resurveying the reconnaissance area using an intensive methodology. The large-site reconnaissance method most certainly missed many large, important sites in the area, and virtually all smaller sites were not recorded. Nevertheless, the reconnaissance data are important because they document the existence of major sites and serve as the basis of future hypotheses.

¹¹ Our recently completed excavations, directed by Cecilia Chávez J. and Edmundo de la Vega at Huaquina–Sillumocco (158) and Palermo (212), are good examples of this type of analysis. Likewise, work at the site of San Bartolomé–Wischachani (022), directed by Dr. Mark Aldenderfer in an independent project, will also provide more detailed ceramic typologies.

Results from the Juli–Pomata Intensive Survey Area

Over the past 100 years or so of archaeological research, a number of important archaeological sites in the Titicaca Basin have been described. Virtually all of these reports concentrated on large ceremonial or administrative sites and did not include the far more numerous habitation sites. Therefore, in spite of this fairly extensive literature, at the beginning of our research there was no settlement typology available for the Titicaca Basin that was applicable to the Juli–Desaguadero region.

Site Typology

We began constructing a typology almost immediately, obviously recognizing the *pukara* hill forts such as Pukara Juli and the artificial mounds typified by Tumatumani (001). The 1989 season was particularly useful for building this typology because we spent considerable time in nonsystematic reconnaissance that allowed us to develop an impression for the range of site types. The several research seasons prior to the 1991–1992 survey provided enough information to develop a preliminary typology. The systematic survey, in turn, provided almost 500 sites to allow us to test and refine this typology (Tables 1 and 2). Based on additional reconnaissance by one of us (Stanish), we believe that this typology (Table 5) is useful for the entire western and southern side of the Lake Titicaca Basin.

We consciously sought to avoid using period-specific criteria to construct this typology. Rather, the criteria that were used were site architecture, site function, topographic location, and outstanding geographical features. The use of these criteria facilitates comparisons through time.

TYPE 1—Large, artificial mounds ($> 50 \times 50$ m at base). These mounds are built with artificial fill that was used to construct nondomestic architectural features. The type 1 sites represent a considerable labor investment and are one of the two

elite/ceremonial site types in the study area. The mounds are not just collapsed structures, but rather represent considerable quantities of fill intentionally used to create architectural features. In this typology, Chiripa, Pucara, and Qaluyu would be classified as very large type 1 sites.

The type 1 site is rare. There are only four sites of this type in our survey zone. Hyslop described only one site that corresponds to this type, the site of Tumatumani (Hyslop, 1976, p. 246; Stanish & Steadman, 1994). Likewise, Kidder described two sites, Sarapa and Asiruni, located near the survey area, that are excellent examples of this site type (1943, p. 10).

TYPE 2—Small, artificial habitation mounds. These artificial mounds are small (generally $< 20 \times 20$ m at base) and represent individual collapsed houses. The distinction between type 1 and type 2 sites is much more than merely size. Unlike type 1, the fill found in this second type of site was not intentionally moved to build corporate constructions. Rather, type 2 sites represent collapsed domestic structures that were turned into a mound. It is not unusual for type 2 sites to have intrusive tombs placed on top of the mound. Type 2 sites are much more common than type 1 sites. There are more than 50 type 2 sites in the Juli–Pomata survey, representing about 10% of all sites, although they represent a smaller percentage of the total population (Tables 3 and 6). These sites are generally found in the pampas near the lake. Figure 9 represents a modern example of a single household, characterized by a cluster of structures, that would collapse into a type 2 mound as seen in the archaeological record.

TYPE 3—Sites built on low, generally nondefendable natural hills with domestic terraces and some sort of corporate architecture on the hilltop. Type 3 sites represent the second elite/ceremonial site type in the region, along with the type 1 artificial mound sites. The site of Incatunhuiri, as described by Kidder (1943, p. 49), is a typical example of this type. In the Juli–Pomata survey, type 3 sites are relatively rare, accounting for less

TABLE 5. Site types in the Juli-Pomata area.

Type 1	Large, artificial mounds
Type 2	Small, artificial habitation mounds
Type 3	Low natural hills with domestic terraces
Type 4	Hillside, domestic terraces
Type 5	<i>Pukaras</i>
Type 6	Dispersed sites built on flat land
Type 7	Urbanized settlements
Type 8	Cemeteries
Type 9	Isolated petroglyphs
Type 10	Raised fields
Type 11	Caves/rock shelters
Type 12	Miscellaneous, such as road cuts, <i>apache-tas</i> , clay sources, lithic scatters, disturbed sites, etc.

than 2% of all sites in the study area, although they accounted for a substantial percentage of the total population in certain periods (Table 6). Figure 10 shows an example of a modern small village settlement that would correspond to the type 3 site in antiquity. Notice that the houses are built around the hill on domestic terraces.

TYPE 4—Type 4 sites are defined as those built on hillsides, utilizing domestic terraces. The domestic terrace site is that found most commonly in the survey area, accounting for a significant percentage of the habitation sites and a majority of the total population (Table 6). Many of the hillsides in the region are terraced and are used today for agricultural purposes. Our survey clearly indicates that a substantial number of these agricultural terraces may have originally been built for domestic purposes and later plowed under for agriculture land use. The agricultural and domestic terraces are almost always faced with fieldstones. Today one can observe house compounds built on the hillside terraces in a pattern that appears to go

back for millennia. Figure 11 is an example of a modern small village settlement that would correspond to the type 4 site. The house is constructed up against the hill, near the pampa. The site is located in the least desirable agricultural land in the immediate area. It was constructed in the steepest and therefore rockiest area, a pattern that appears to hold in antiquity as well.

TYPE 5—Type 5 sites are the *pukaras*. These are the classic hilltop fortified sites found throughout the altiplano and described by Hyslop (1976, p. 110). These sites almost always have standing architecture, surrounded by at least three large defensive walls. We recognize two types of *pukaras*: major ones, characterized by some resident population and massive wall architecture, and minor ones (Fig. 12), characterized by few artifactual or architectural remains in a much smaller walled area.

TYPE 6—Dispersed sites built on flat land usually near the lake or in the *puna* regions. These sites are inevitably artifact scatters. They lack any evidence of domestic terracing or other constructions. In some circumstances these sites could be type 2 sites that had been destroyed, or could represent very light or transient occupations. In at least one case, a lithic workshop was classified as a type 6 site. Type 6 sites are rare in the region, accounting for a small percentage of the habitation sites in the survey.

TYPE 7—Large urbanized sites. These sites are rare and refer principally to the large, sprawling concentrations of people typical of the Late Horizon and Early Colonial periods in places such as Juli and Pomata. An absolute definition of the term "urban" remains an elusive goal. At one extreme, sites such as Pucara, in the far northern

TABLE 6. Population per habitation site type per period.

Type	MF*	UF	TIW	ALT	INCA	EC
1	3.00 (13%)	5.50 (16%)	9.05 (14%)	1.25 (1%)	4.00 (2%)	3.00 (1%)
2	0.53 (†)	0.69 (†)	5.35 (8%)	11.88 (16%)	13.97 (7%)	9.60 (6%)
3	5.00 (21%)	12.00 (36%)	23.75 (37%)	4.25 (5%)	6.00 (3%)	3.50 (2%)
4	14.41 (62%)	14.53 (44%)	23.90 (38%)	51.38 (69%)	112.04 (62%)	100.56 (65%)
6	0.00	0.00	0.20 (†)	5.17 (6%)	14.99 (8%)	9.40 (6%)
7	0.00	0.00	0.00	0.00	27.00 (15%)	27.00 (17%)

The data reflect the total population as measured by total habitation area (ha) and relative population as a percentage of the total (in parentheses). Total percentage per period may be slightly larger than 100% due to sites that fall into two categories. Type 5 sites are not habitation sites and so are not included in the table.

* Abbreviations are given in the footnotes to Tables 1 and 2.

† Less than 1%.



FIG. 10. Example of site type 3.



FIG. 11. Example of site type 4.



FIG. 12. Minor *pukara*.

Titicaca region, are considered urban (Rowe, 1963); at the other extreme some archaeologists would only consider sites such as Chan Chan and Cuzco to be Andean urban centers. We consider an urban site to be one that contains a significant percentage of nonagricultural laborers. By this definition, truly urban type 7 sites appeared only relatively late in the Juli–Desaguadero region during the Inca occupation. They contained about 15% of the total population in the Late Horizon and Early Colonial periods (Table 6).

TYPE 8—Cemeteries. Cemeteries are found throughout the survey area. Tombs are located in a variety of contexts, ranging from those isolated from habitation areas to large cemeteries with multiple types of tombs. There are a number of tomb types in the Juli–Desaguadero region:

a) Cist or Shaft Tombs—Cist tombs are completely below-ground constructions. They range in size from shallow pits to 1-m-deep shafts. Mouth diameters are around 35–50 cm, although some are larger. Cist tombs appear to be the most common type of tomb in the study area. Most of these tombs are lined with stone, but they are not exceptionally well made. Based on their size and the human remains scattered at the surface, below-ground cist tombs rarely contain more than two individuals, and they usually contain only one. Cist tombs are rarely found in isolation; they are

located in aggregated cemetery areas very close to habitation sites.

b) Slab-Cist Tombs (Fig. 13)—These are above-ground constructions first described by Tschopik (1946, p. 19). They are all post-Tiwanaku in date. Slab-cists are cist or shaft tombs with an encircling ring of stone slabs at the surface. The slabs are large and uncut, but they were selected for more or less uniform size. The slabs are set upright around the tomb, and they average about 1 m in diameter. In some cases the below-ground depression is very slight, perhaps only 20 cm or so.¹² In other cases there is a fairly deep shaft with encircling slabs. There is evidence from our survey that in some cases slabs were looted from Tiwanaku and Upper Formative sites for use in the later tomb constructions. Like cist tombs, slab-cist tombs are generally found clustered in cemetery areas near habitation sites.

Slab-cist tombs differ fundamentally from cist tombs in that they contain multiple burials. They appear to function in a manner similar to that of *chulpas*; they are used for the burial of large numbers of people and are visible from the surface. Like *chulpas*, slab-cists are most likely “mauso-

¹² One possible confusion in the literature is that Hyslop seems to define some slab-cists as cist tombs.



FIG. 13. Example of slab-cist tomb.

leums” for corporate groups, probably extended families.

c) **Chulpas or Fully Above-ground Tombs** (Hyslop, 1977)—The term *chulpa* is listed by Bertonio as a “grave or basket where they put the dead” (1956[1612], Book 1, p. 430). However, a much more common term in his dictionary is *Amaya uta*, defined as a “burial in the ancient manner” (Bertonio, 1956[1612], Book 1, p. 218), or a “grave like a house on the ground” (Bertonio, 1956[1612], Book 1, p. 430). The term *Amaya uta* literally translates as a “house of the soul.” We continue to use the term *chulpa* because it is so deeply entrenched in the scientific literature.

Hyslop (1977) described a number of *chulpa* types that we discovered on our survey. He published descriptions of several types of *chulpas*, such as “adobe,” “igloo style,” *pirca* stonework style, “Inca” stonework styles, and the like. Hyslop also provided a chronological typology of *chulpas*, suggesting that the “rustic” igloo style and *pirca* style *chulpas* were earlier, and that the large *chulpas* with “Inca” style stonework were late. Hyslop (1977, p. 154) argued that *chulpa*

building began in the Altiplano Period, a conclusion that was corroborated by our survey data.

Most of the *chulpa* tombs in the Titicaca Basin have been destroyed through centuries of looting. An obscure reference by the 19th-century European naturalist Marquis de Nadaillac suggests that *chulpas* were once much more common than today. Near Acora, for instance, he states that “One vast plain is covered with stones placed erect . . . hence the towers or *chulpas* which, mixed with megaliths, cover the whole plain of Acora” (Nadaillac, 1969[1885], p. 424). Today, apart from the large, cut stone *chulpas* on the ridge away from town, there is little evidence of *chulpas* in the region around Acora. Nadaillac went on to say that “everywhere they [*chulpas*] form one of the characteristic features of the landscape” (1969[1885], p. 426).

Chulpas are often found isolated from habitation areas on the tops and sides of ridges, on hill-tops, and along roads or trails. The significance of this remains to be fully investigated.

d) **Intrusive Tombs in Type 2 Pampa Mounds or Rock Piles**—The abandoned type 2 pampa mounds were convenient places for buri-

als. A number of rock piles have tombs in them as well, similar to the intrusive tombs in the artificial mounds. The tombs tend to be isolated cist or slab-cist tombs.

TYPE 9—Petroglyphs. A number of petroglyphs were found throughout the study area. Generally, these were associated with a habitation site and included in the site description.

TYPE 10—Raised fields. Raised fields are listed as a distinct site type although they were not registered in the survey as separate sites.

TYPE 11—Caves and rock shelters. Caves and rock shelters are rare near the lake but are more common above 4200 m or so. Because the bulk of our survey area was near the lake, where there are few geological formations with rock shelters, type 11 sites were not common.

TYPE 12—Miscellaneous. This category includes road cuts, clay sources, *apachetas*, lithic scatters, disturbed sites, and the like.

Ceramic Types in the Juli-Desaguadero Region

Early Formative Period

There was one Early Formative Period diagnostic ceramic type in the entire study area, defined as the “Pasiri” type. The Pasiri type (Figs. 14, 15) is identified by its paste and surface treatment characteristics. These ceramics were poorly fired, unslipped, and had heavy inclusions of fiber and sand. There are no complete vessels, nor do we have many rims. The few rims collected appear to be from thickened-rim, slightly flaring ollas, and from slightly thinner jar forms.

The precise chronological position of this ceramic type remains problematic because there is poor stratigraphic association from excavations at our sites. However, a number of observations from surface collections suggest that this ceramic type is the earliest so far defined in the study area. First, this ceramic type is not very widely distributed. It is found in only ten sites in the intensive survey region (022, 113, 158, 210, 212, 282, 321, 342, 422, and 457) and in one site in the reconnaissance areas (Tacapisi). Of these eleven sites, at least six have Late Archaic occupations. In fact, in every multicomponent Late Archaic site, there are also Pasiri ceramics, a fact that suggests that the ceramic type is quite early.

Analysis of the ceramic assemblage at Tuma-

tumani supports this chronological placement of the Pasiri assemblage. With several thousand fragments analyzed, no Pasiri ceramic diagnostics were discovered. This is significant, because Tumatumani has a substantial Early Sillumocco component and represents a huge sample. These data suggest that the Pasiri type is not a poorly fired subset of the Middle Formative fiber-tempered wares but a chronologically distinct type. In fact, the Pasiri ceramic type is not found on most sites that date to the Middle Formative. In no case did we find a Late Archaic and Middle Formative component without Pasiri ceramics, but it was very common to find Middle Formative sites without Pasiri ceramics. In other words, the Pasiri ceramic type is consistently found on Middle Formative sites only if there is a Late Archaic occupation, but there are many sites with Middle Formative occupations without Pasiri ceramics.

Finally, the settlement distribution of the Pasiri sites is consistent with models of Late Archaic/Early Formative occupations in the area (see discussion of settlement patterns below, pages 50–51). The sites are more or less evenly distributed along the landscape, near the lake. There is a cluster of Pasiri sites in the Moyopampa area, a pampa that would have been particularly rich in resources compared with the rest of the intensive survey area. In other words, the distribution of sites defined on the basis of Pasiri ceramics is consistent with a model of initial early village settlement out of a fully Late Archaic lifeway. This observation indirectly supports the validity of the Pasiri ceramic type category as well.

Middle Formative Period

The Middle and Upper Formative Period ceramic types in the Juli area are called Early and Late Sillumocco, respectively.¹³ The Early and Late Sillumocco periods cover by far the largest absolute time of any in the region. The Early Sillumocco begins around 800 B.C., and the Late Sillumocco ends around A.D. 400, for a span of about 1200 years. Likewise, the Early and Late Sillumocco periods were characterized by some of the most intense cultural changes in the Titicaca re-

¹³ The following description of Early and Late Sillumocco ceramics is adapted from Steadman's chapter in Stanish and Steadman (1994). This monograph contains a highly detailed and extended discussion of these and other ceramic types and should be consulted for comparative analyses of other sites in the region.



FIG. 14. Pasiri diagnostic ceramic artifacts.

gion. As a result, the two periods exhibit the greatest variety of ceramic types, as represented by the following typology.

The term Sillumocco was created, at least from the ceramic point of view, because the ceramic assemblage from Sillumocco sites shows sufficient local variation to make it difficult to equate it directly with any previously defined sequence (Stanish & Steadman, 1994). Sillumocco ceramics

are clearly a local product and are distinctive enough to merit their own cultural designation.

We define the division between Early and Late Sillumocco as based on a change from a predominantly fiber-tempered assemblage to a predominantly non-fiber-tempered assemblage at around 200 B.C. (Steadman, in Stanish & Steadman, 1994). The division remains subject to future revision because we do not know the degree to



FIG. 15. Pasiri diagnostic ceramic artifacts.

which fiber- and non-fiber-tempering traditions overlapped. Clearly, some overlap does exist, by perhaps as much as 200–300 years, but the bulk of the ceramics, particularly the utilitarian wares, show a change in paste composition. The transition between Early and Late Sillumocco is believed to be contemporary with the end of Chiripa Mamani and the beginning of Tiwanaku I. Again, this must remain tentative because we do not know if there is a precise correlation between the

Juli–Desaguadero and Bolivia area sequences. We see the beginning of Tiwanaku I as substantially later than reported by Ponce Sanguines (1981, p. 137), who suggested a date of 1580 B.C. based on one outlier C-14 date. We place it sometime around 200 B.C.

There are five diagnostic types of Early Sillumocco period pottery used to date sites on the survey: Early Sillumocco Plain, Early Sillumocco Qaluyu Incised, Early Sillumocco Qaluyu Poly-

chrome, Early Sillumocco Chiripa Polychrome Incised, and Early Sillumocco Chiripa Polychrome.

The Early Sillumocco Plain is by far the most common diagnostic in the survey region. It is similar in paste and finish to the Early Sillumocco decorated wares described below, and to plain wares from the site of Chiripa (Mohr, 1966). The plain wares are exclusively manufactured in fiber-tempered pastes, and the vast majority are locally made. Shapes include ollas with short, slightly flared or vertical necks; direct, rounded, or slightly rounded rims; or rims with interior thickening; and sometimes rim-to-body strap handles. Jars have somewhat taller, slightly flared necks, also with direct rims, whereas bowl shapes are similar to those of the decorated wares, slightly flared or vertical with direct or thickened rims. Circular and horizontal body lugs are also found. The majority of vessels are burnished, most to a high or medium luster. Vessels are somewhat more likely to be unslipped. An unslipped brown with a dark smudged or incompletely oxidized paste is the most common. Among the slipped sherds, a red slip color on a red-brown incompletely oxidized paste is the most popular, with the brown and dark brown slip colors following.

Early Sillumocco Qaluyu Incised ceramics found in the Juli area are similar to those illustrated from the sites of Qaluyu (Lumbreras & Amat, 1968) and Marcavalle (Chávez, 1981). They are generally slipped red, red-brown, or brown and are decorated with curvilinear designs executed in a wide line incision. Shapes include slightly flared bowls with thickened rims. Specimens are generally well-finished and burnished on both sides. Qaluyu-related incised ceramics are found in both the local sand-tempered and fiber-tempered pastes of the Juli area and are most commonly oxidized to a red-brown color, or incompletely oxidized with a dark core.

Early Sillumocco Qaluyu Polychrome ceramics are painted in dark brown or black on a light brown or cream background, with variants having a white, red-brown, or brown background color. Specimens in which the rim section is preserved show that the rim itself and the interior of the vessels are slipped red. Vessel shapes consist of a flared or slightly flared bowl with a direct or thickened rim. Decorative motifs include checkered elements, lattices, chevrons, and rectangles. Vessels are predominantly manufactured in the local sand-tempered and fiber-tempered pastes and more rarely in a nonlocal sand-tempered paste. They are generally well-finished and burnished.

This ceramic type is again very similar to specimens found at Qaluyu (Lumbreras & Amat, 1968) and at Marcavalle (Chávez, 1980). Although black on cream decoration is more commonly found at Qaluyu, the red-slipped rim and interior is a trait more characteristic of the Marcavalle specimens. In addition, the Juli sample incorporates some local variation, particularly in the range of slip colors and color combinations.

Early Sillumocco Chiripa Polychrome Incised ceramics are found in a variety of color combinations, including black and yellow on red, black on red, white on red, dark red on red, dark red and yellow on red, and red on red-brown. Color areas are delineated by a fine or medium width incision, forming geometric or block color motifs. Shapes are mostly slightly flared or vertical bowls with direct or thickened rims. Unslipped or brown-slipped ceramic tubes or trumpets with incised decoration were also found. These ceramics were manufactured exclusively in the fiber-tempered pastes, in both the local version and a semi-local paste whose source is unknown. Vessels are generally incompletely oxidized and well-finished. Many of the specimens of this type found in the Juli area, particularly those with black and yellow on red designs, compare closely to specimens illustrated from the site of Chiripa (Bennett, 1936; Mohr, 1966). Others, particularly those with unusual colors, represent local Juli variations or temporal differences in the assemblage.

Early Sillumocco Chiripa Bichrome ceramics are generally painted in cream or yellow on a red background. Motifs are again geometric, including block color areas, pendant triangles, and zig-zag lines. More rarely, different color combinations, such as black on red or red on red-brown, are found. Vessel shapes are exclusively bowls with vertical, slightly flared, and flared wall profiles. Vessels are well-finished and manufactured in the same local and semilocal fiber-tempered pastes as the Chiripa-related polychrome incised ceramics. Again, most of these ceramics are similar to the cream on red painted specimens from Chiripa, whereas the rare or variant pieces are most likely due to temporal or local variation.

Upper Formative Period

Four recognizable types of Late Sillumocco pottery were utilized in the survey analysis: Late Sillumocco Plain, Late Sillumocco Polychrome Incised, Late Sillumocco Incised, and Late Sillu-

mocho Qeya Polychrome. The Late Sillumocco assemblage is characterized almost exclusively by non-fiber-tempered utilitarian and decorated wares. The use of fiber temper persisted in this period only on a very limited scale, and it occurs only in minor quantities in one of the pastes, used for the manufacture of a small number of utilitarian wares and Tiwanaku IV decorated ceramics. We anticipate being able to subdivide the Late Sillumocco Period in the future, because it is evident that some of the specimens assigned to this period bear more of a resemblance to Tiwanaku I ceramics and some are more clearly related to the later Qeya assemblage.

Late Sillumocco Plain wares are in the vast majority sand tempered and locally made. A small percentage are manufactured in the local fiber-tempered paste or one of the semilocal sand-tempered pastes. The local sand-tempered specimens are mostly an unslipped black, gray, or gray-brown, often with a micaceous appearance, and they are most commonly incompletely burnished on the exterior only, although wiped finishes are also prominent. Other surface colors for these wares include an unslipped red-brown and, less frequently, a red or light brown slip. Vessels are generally oxidized or oxidized with smudged edges. Shapes include jars with flared or slightly flared necks and flat or angled rims, sometimes with incised fillets at the neck constriction, and flared or slightly flared bowls with flat, triangular or rounded rims, sometimes embellished with incision on the rim, rim tabs, or horizontal handles. Flared straight-sided bowls are also found with loops or loop handles on the rim. Base shapes include a thickened-edge version, as well as flat, ring, and pedestal forms. The locally made fiber-tempered wares of this period are very similar in surface finish, color, and shape to the sand-tempered wares, differing only in their pastes. The semilocal sand-tempered wares are found in roughly equal numbers of gray or dull gray-brown unslipped wares and an unslipped red-brown or light brown. Slipped specimens are again in the minority and consist mostly of red or light brown slips. Most of these wares have wiped surfaces, and burnishes are found less frequently than on the locally made wares. Vessel shapes include jars with flared or slightly flared necks and rounded, thickened or flat rims, and slightly flared bowls with rounded rims. Both flat and ring bases are found. The Late Sillumocco Plain wares exhibit both general and specific similarities to plain wares from Pucara (Franquemont, 1986; Chávez, 1992) and Qalzasaya (Ponce Sanguines, 1971), but they

are most comparable to Qeya plain wares, particularly those from Qeya Qollu Chico (Wallace, 1957).

Late Sillumocco Polychrome Incised ceramics were manufactured mostly in a semilocal sand-tempered paste, although some examples of the local sand-tempered pastes are also found. Specimens are decorated with red, light red, or pink, cream, yellow or white, and black on an unslipped or light brown-slipped background, with color areas delineated by fine or medium width incised lines. Motifs are geometric: step blocks, chevrons, or rectangles. Vessels are burnished on the exterior only, and fired paste color is mostly a light brown. Shapes consist of direct-rimmed slightly convex or slightly flared bowls. These ceramics bear general similarities both to ceramics from Pucara (Rowe & Brandel, 1971; Franquemont, 1986; Chávez, 1992) and ceramics that date to the Qalzasaya Period from Tiwanaku (Ponce Sanguines, 1971). However, they are not directly comparable to either of these two ceramic assemblages but appear rather to be a local or semilocal production from the Juli area.

Late Sillumocco Incised pottery consists of unslipped or single-color slipped ceramics with incised decoration. One group of these ceramics has an unslipped gray, gray-brown, or black surface color with a wiped or smoothed finish. Firing consists of an oxidized red-brown paste core with dark, lightly smudged edges. Incised motifs for this group are nested rectangles, fields of punctate dots, and squares. Examples exist with post-fire red and yellow paint in the incisions. Other incised wares are slipped red or light red, or an unslipped red-brown. Designs are similar to the gray wares: parallel lines, double circles, nested triangles, and fields of punctate dots. These ceramics are also sometimes found with red or yellow post-fire paint, and the surface finish is again wiped or smoothed. Shapes consist of vertical-sided bowls, probably incensario shapes as well, and ring-based forms, again suggesting an incensario shape. Ceramic tubes or trumpets are also found in the red- or light brown-slipped group. Except for the few trumpet specimens in one of the semilocal sand-tempered pastes, all of these Late Sillumocco Incised ceramics were manufactured in the predominant sand-tempered local paste. These ceramics are closely comparable to incised specimens generally given a Qeya date in the Tiwanaku sequence, such as those illustrated and discussed by both Bennett (1934) and Wallace (1957). The group of gray unslipped wares, in

particular, is very similar to these Qeya ceramics, especially those found at Qeya Qollu Chico, in their gray surface colors and motifs. The red- and light brown-slipped pieces, in contrast, show closest similarities to specimens from the northern basin discussed by Chávez (1985) and also ascribed by her to the Qeya or Early Tiwanaku Period.

Late Sillumocco Qeya Polychrome painted sherds, very similar to those of the Qeya Period in the Tiwanaku area (Bennett, 1934; Wallace, Bermann, 1957; Bermann, 1990), are decorated with diagonal lines, triangles, and triangle bands in black and red on a cream, white, light brown, or orange background, or on an unslipped light brown background. Exterior surfaces are generally burnished and the interiors wiped. Vessel shapes include bottles and slightly flared bowls or cups. Two different paste groups are found in the Qeya Polychrome ceramics. One, consisting mostly of the local sand-tempered pastes, has a light brown fired paste color and thick slips. The other has thinner slips and a smoother surface contour; it was manufactured in a nonlocal paste that is more similar to Tiwanaku IV and V pastes in its hard-fired dense texture and red-orange color. Differences between these two groups may be temporal, or they may be due to geographical variation.

Tiwanaku Period

The Tiwanaku type represents a highly distinctive pottery style defined largely by surface decoration and vessel form. It is characterized by predominantly black-on-red or black-on-orange decorations. We also discovered Tiwanaku polychromes and black-and-white decorations on red or orange slips. The most common shapes are keros and tazones. Keros are found with and without bands around the body. Incense burners are also a common shape in the Tiwanaku ceramic assemblage in the region. We recognize six subtypes: Tiwanaku Polychrome, Tiwanaku Black on Red, Tiwanaku Black on Orange, Tiwanaku Black and White on Red, Tiwanaku Black and White on Orange, and Tiwanaku Plain.

The vast majority of Tiwanaku pottery in the Juli-Pomata area would be classified as Tiwanaku IV and Tiwanaku V in the Bennett-Ponce typology (Fig. 4). The repertoire of design types from these surface finds is quite limited compared with those published by Bennett (1934), Ponce Sangüines (1981), and Alconini Mujica (1993) for Tiwanaku sites in the region. Goldstein (1989) also

found a much greater variety of Tiwanaku styles in the Tiwanaku colony of Omo in the Moquegua Valley. The typical Tiwanaku base slips—red, orange, and brown—are found on all sites. Polished black ware (Bennett, 1934, p. 396) is very rare, and virtually no incised black wares were found on survey, although a few were found in excavations at the site of Sillumocco-Huaquina (158). Black, orange, and white are used in the designs, generally as independent design elements. This latter design practice is described by Bennett as a characteristic of the Decadent or latest phase of Tiwanaku (Bennett, 1934, p. 456).

The two most common decorative motifs on the Tiwanaku materials from the study area are the “perpendicular wavy line” design and the step pattern (Bennett, 1934, p. 401). Flamingo motifs are also found in the survey area. Bennett (1934, p. 402) considered these bird designs to be late. Occasionally, keros and tazones have interior decoration, particularly the common “perpendicular wavy line” (Bennett 1934, p. 401), on the rim. We found very few typical Classic Tiwanaku designs, such as condors, trophy heads, front-face deities, and the like. Only a small fraction of the pieces showed evidence of having more than three colors (“two-color ware” in Bennett’s stylistic classification [1934, pp. 397–398]).

Plastic decoration on the Tiwanaku Plain subtype includes a number of pieces characterized by raised punctate necklace decorations identical to those described by Bermann (1990, p. 503) from Lukurmata in Bolivia. We also found olla or jar handles with a raised cross motif. This motif is also found in Moquegua in Tiwanaku-related contexts (Stanish, 1991, p. 30).

It is important to note that most of Bennett’s surface collections were classified as Decadent. Likewise, he noted that most of his first and second levels (highest) were Decadent as well (Bennett, 1934, p. 456). In contrast, the vast majority of his Classic examples came from excavated contexts. The pieces illustrated by Ponce Sangüines (1981) and Goldstein (1989) come from excavations as well. It is therefore possible that the lack of variety in design types from the Juli-Desaguadero area is a sampling problem, in that most of our sample is from surface sites. Analysis of the excavated materials will provide a much larger sample. Examples of Tiwanaku types are found in the ceramic illustrations, including numbers 121.001-3, 121.001-13, 136.001-7, 158.001-1, 208.001-7, 210.001-6, 210.001-25, 261.001-1, 261.001-3, 336.001-21, 336.001-9,

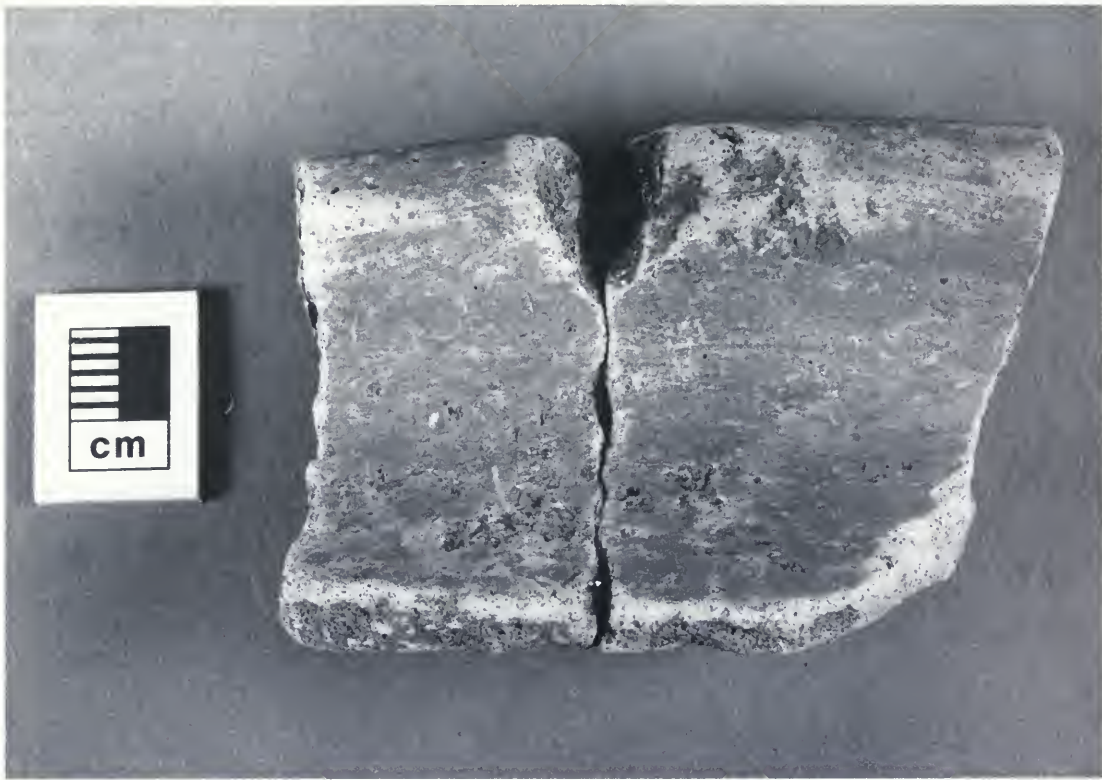


FIG. 16. Pucarani diagnostic ceramic artifact.

336.001-10, 396.004-3, 399.001-3, 411.001-1, 419.001-7, 419.001-13, 421.001-3, 421.001-10, 421.001-20, 421.001-27, 422.001-48, and 422.001-49.

Altiplano Period

Altiplano Period diagnostics consist largely of bowls, jars, and olla forms. We have called the most common ware Pucarani (de la Vega, 1990). This ware is Altiplano Period in date and is locally manufactured. De la Vega's (1990) analysis of the Pucarani ware includes several decorated varieties and five discrete pastes that are found in quantity on Pukara Juli. The paste is semi-compact, with temper inclusion of quartz, feldspars, pyrite, and sand. We recognize five types: Pucarani Plain, Pucarani Black on Red, Pucarani Black and White on Red, Pucarani Red on Orange, Pucarani Red on Brown, and Pucarani Black on Orange.

Pucarani decorated bowls are characterized by deep, thin-walled vessels with black decoration on

the interior (Figs. 16–21). The decorated Pucarani ware shows some stylistic links to Hyslop's Tanka Tanka Black on Orange, several pre-Inca Sillustani types, and the Early Pacajes type identified by Albarracin-Jordan and Mathews (1990) from the Tiwanaku valley. Examples of sherds are found in the section of ceramic illustrations, including numbers 102.001-1, 230.001-3, and 396.003-1.

A small number of Altiplano Period diagnostics are classified as Sillustani, first identified and named by Tschopik (1946, pp. 22–27) and further discussed by Julien (1982), Revilla Becerra and Uriarte P. (1985), and Stanish (1991). Using these definitions, Sillustani pottery includes both pre-Inca and Inca types. The pre-Inca types are poorly burnished on the exterior, have parallel black lines on red or reddish brown surfaces, and tend to have very thin walls. They are very rare in the research area.

In the Desaguadero area and further to the south, we discovered an additional Altiplano Period type that we have called Kelluyo (Fig. 22). Kelluyo diagnostics are exclusively straight-sided



FIG. 17. Pucarani diagnostic ceramic artifact.

bowl forms. They are characterized by typical Altiplano Period design motifs: poorly executed black linear paint on the interior of the vessels.

Late Horizon Period

There are several distinct types of Late Horizon diagnostics in the Juli–Pomata, Ccapia, and Desaguadero areas. The most common shape by far is the bowl form, with Inca bottles or aryballoids quite common as well. The most common decorative motif is Local Inca (Figs. 23–25). This type is essentially Inca pottery manufactured in the Titicaca Basin. It therefore dates to the Late Horizon, ca. A.D. 1450–1532. These pieces are imitations of Cuzco pottery, with bottle and bowls being the predominant forms. In particular, the use of Cuzco motifs and the distinctive double protuberance at the lip of bowls serve to identify this type. Julien (1983, p. 146) notes that the use of local pastes and pigments and the misinterpretation of Cuzco motifs identify the Local Inca style as locally manufactured in the Titicaca area. We

recognize three subtypes within the Local Inca assemblage: Local Inca Plain, Local Inca Polychrome, and Local Inca Bichrome. Examples of Local Inca are found in the ceramic illustrations, including numbers 002.000-6, 002.000-7, 002.001-13, 002.001-6, 002.001-9, 190.001-2, 190.001-9, 190.001-12, 274.002-3, 282.001-3, 282.003-1, 286.001-3, 385.001-11, 385.001-13, 385.001-14, 385.001-15, 385.001-17, 396.005-8, 421.001-6, and 454.002-20.

Another Late Horizon type is Chucuito (Fig. 26). Virtually all Chucuito types are bowl forms. It was first defined by Tschopik (1946, pp. 27–31) as two related wares: Chucuito Polychrome and Chucuito Black on Red. The dominant decorative motifs include animal and plant designs with smaller numbers of human, insect, and geometric designs. The Chucuito ceramics in the Juli–Pomata area are locally manufactured. Tschopik (1946, p. 27) noted that Chucuito pastes are fine textured and tend to be pink or light red in color. They are sand tempered, with occasional mica inclusions. Examples of the Chucuito type are found in the ceramic illustrations, including

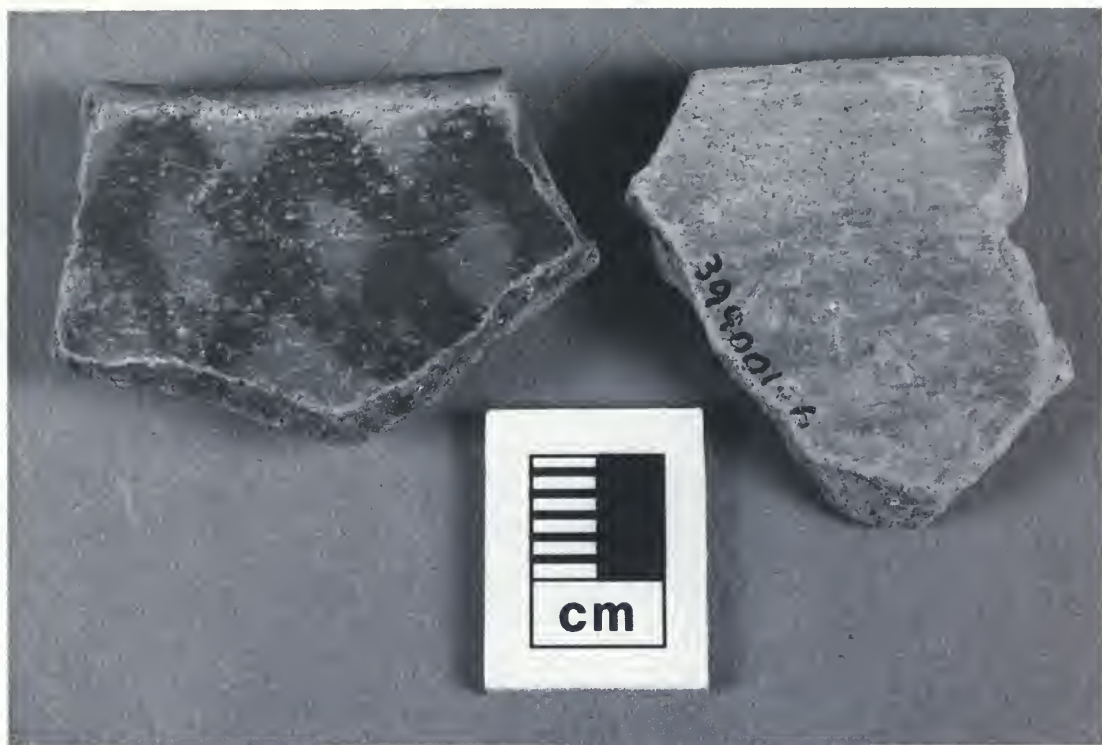


FIG. 18. Pucarani olla/jar rim from 399.

numbers 002.001-8, 002.001-10, 002.001-6, 13.001-33, 37.001-1, 70.001-7, 70.001-13, 78.001-1, 114.001-1, 121.001-3, 175.003-2, 193.001-7, 205.001-1, 221.001-5, 226.004-12, 227.001-3, 230.001-2, 230.001-3, 273.001-1, 274.002-3, 282.001-1, 282.003-1, 282.001-6, 286.001-1, 306.001-10, 385.001-10, 385.001-11, 385.001-18, 396.005-8, 449.001-1, 449.001-7, 449.001-12, and 454.002-11.

Pacajes is a Late Horizon type more common in the Desaguadero area that was first reported in detail by Rydén (1957, pp. 235–238) from a number of sites in Bolivia (Fig. 27). Albarracín-Jordan and Mathews (1990, p. 171) and Mathews (1993) refer to this type as Pacajes-Inka and assign it a Late Horizon date. This ceramic type is almost certainly associated with the Pacajes region of the south basin. Pacajes ceramics are easily recognized by the distinctive “llamita” designs (and similar unrelated shapes) on the interior surface of bowls. Our Pacajes ceramics all appear to be Late Horizon in date, given their similarity to Chucuito and Local Inca bowls. The low occurrence of this type in the region and its greater known density to the south strongly suggest that Pacajes is an exotic import in the Juli–Pomata

area. With one exception, all Pacajes examples from the Juli–Desaguadero study area are bowl forms. Examples of the Pacajes type are found in the ceramic illustrations, including numbers 002.001-7, 145.001-2, 221.001-5, 385.001-10, 385.001-18, and 454.002-14.

Sillustani types are found in both Altiplano and Late Horizon contexts, as determined by stratigraphic excavations and stylistic analysis (Julien, 1983, pp. 116–125; Stanish, 1991, pp. 13–14). Late Horizon Sillustani types are fairly easily distinguished by thicker lips, shallower bowl forms, finer exterior burnishing, and more elaborate design motifs. The Late Horizon Sillustani type was also first identified and named by Tschopik (1946, pp. 22–27) and further discussed by Julien (1982), Revilla Becerra and Uriarte P. (1985), and Stanish (1991). As with the pre-Inca types, virtually all Sillustani diagnostic are bowls. The primary defining characteristic of the Sillustani type is the set of parallel lines along the interior rim of burnished or polished bowls. Tschopik suggested four “wares” within the Sillustani “series”: Sillustani Polychrome, Sillustani Brown on Cream, Sillustani Black on Red, and Sillustani Black and White on Red. We did not find any Polychrome (with

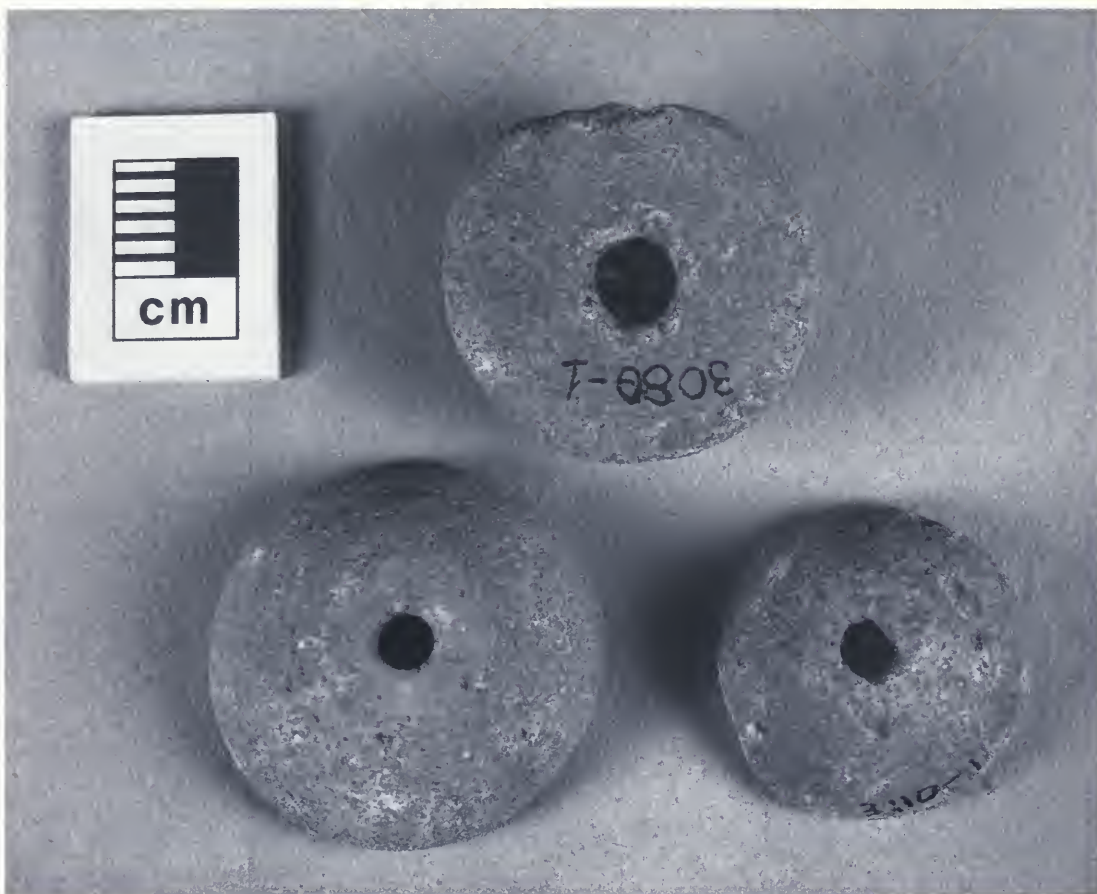


FIG. 19. Spindle whorls from Pukara Juli (003).

one exception that was classified as a possible Chucuito Polychrome) or Black and White on Red in the Juli–Pomata area and therefore did not include these in our typology. We defined an additional subtype, Sillustani Black on Orange. Based on paste characteristics, the Sillustani Brown on Cream is hypothesized to be an import to the Juli–Pomata area, while the Black on Orange and Black on Red are most likely locally made. Examples of the Sillustani type are found in the ceramic illustrations, including numbers 107.001-1, 110.001-1, 288.001-7, 343.001-4, 343.001-7, 385.001-9, 396.005-8, 422.001-22, 449.001-9, 454.002-1, and 454.002-7.

Early Colonial Period

Early Colonial Period diagnostics are exclusively bowl forms that we have called Chocasuyu. The principal defining characteristic is a slightly

everted lip with poorly executed black and occasionally white decoration. Albarracin-Jordan and Mathews (1990) found identical types and called them Late Pacajes. They also dated these to the Early Colonial Period. Decorative motifs come in several varieties, including plain wares, Chocasuyu Black and White on Red, Chocasuyu Red and White on Red/Orange, Chocasuyu Black on Red, Chocasuyu Red on Orange, Chocasuyu Black on Orange, Chocasuyu Black on Brown, and Chocasuyu Glazed types. Chocasuyu pastes tend to be similar to the earlier Local Inca ones. The Chocasuyu type appears to be locally manufactured, based upon paste similarities to the Local Inca and Chucuito types. Examples of the Chocasuyu type are found in the ceramic illustrations, including numbers 59.001-1, 94.002-2, 154.001-1, 154.001-2, 154.001-3, 169.003-3, 216.001-1, 217.001-1, 221.001-4, 224.001-2, 227.001-10, 227.001-3, 290.004-13, 396.005-5, 396.005-9, and 411.001-9.



FIG. 20. Pucarani ceramic vessel.



FIG. 21. Pucarani ceramic vessel.

Settlement Patterns in the Juli–Pomata Intensive Survey Area

Late Archaic Period Settlement Pattern

We found seven Late Archaic sites in the Juli–Pomata region. The density of Archaic sites in the Juli–Pomata region is less than that discovered by Mark Aldenderfer in the only other intensive and systematic survey on the Peruvian side of the circum-Titicaca region. It is likely that we missed some Archaic lithic scatters. It is also likely that sedimentation near the lake and the lack of substantial cultural remains typical of Archaic sites have obscured many of these sites.

Four Archaic sites are lithic scatters with some diagnostic artifacts on the surface (Fig. 28). Two Archaic sites are rock shelters with at least some red figures painted on the walls that are typically Archaic in style. The rock art was identified by Aldenderfer as dating from the Late Archaic to the Late Sillumocco and possibly Tiwanaku periods. One site, San Bartolomé–Wiscachani (022), is a Lower and Middle Formative site with a Late Archaic component. The Archaic Period settlement is beyond the scope of this research. Nevertheless, it is significant that we discovered seven

sites near the lake, including the complex site of San Bartolomé–Wiscachani, which represents the beginning of sedentary ways of life in the basin. Intensive survey methodologies designed to uncover these pre-ceramic sites will undoubtedly discover additional sites in the Juli–Pomata region.

Early Formative Period Settlement Pattern

It is once again important to emphasize that the definition of the Pasiri ceramic diagnostic is tentative. Presuming the validity of this type, however, we have identified a number of Early Formative sites in the intensive survey area and one site in the Ccapia reconnaissance area (Tacapisi). We did not locate any Early Formative sites in the Desaguadero reconnaissance area, although our large-site-size survey methodology was not suited to finding such small sites.

The distribution of Pasiri sites in the intensive survey area is illustrated in Figure 29. The most significant characteristic of this pattern is a generally even distribution of settlements along the lake edge, with a slight clustering of sites in the Moyopampa region. The Moyopampa region is the richest ecological zone in the intensive survey



FIG. 22. Kelluyo diagnostic ceramic artifacts.

area. The slight clustering of the earliest village sites in the Moyopampa region can be explained by a resource maximization strategy, with fewer settlements in areas of fewer resources.

Pasiri ceramics are rare and difficult to distinguish on the surface. As a result, it is impossible to accurately estimate average site sizes for this period using intensive walkovers. However, in the five sites with Early Formative occupations and without significant later occupations, the average site size is less than 1 hectare (0.8 ha). The average site size of the later Middle Formative occupations is only slightly larger (0.92 ha), so it is safe to deduce from these data that the Pasiri sites were no larger than 1 ha on average, and probably much smaller.¹⁴

¹⁴ In fact, if the large Middle and Early Formative site (no. 342) is removed, the average size of Pasiri sites without significant later occupations is a mere 0.33 ha.

Middle Formative Period Settlement Pattern

The local Middle Formative occupation in the Juli region is called Early Sillumocco. The word "Sillumocco" means "fingernail hill" and is a local toponym located a few kilometers due west of Juli. The Sillumocco Period was named after site 158, called Sillumocco-Huaquina, a classic type 3 site with a large semisubterranean structure at the top of the hill. The Early Sillumocco spans the end of the Middle Formative and the early part of the Upper Formative. It dates to approximately 800–200 B.C. It would partially overlap with the periods of Qaluyu, Cusipata (Mujica, 1987), Chiripa Llusco and Mamani (Browman, 1980), and the Middle and Late Chiripa (Chávez, 1988, p. 2). One carbon sample obtained from Early Sillumocco construction fill from Palermo provided an uncalibrated date of $2,810 \pm 80$ years before the

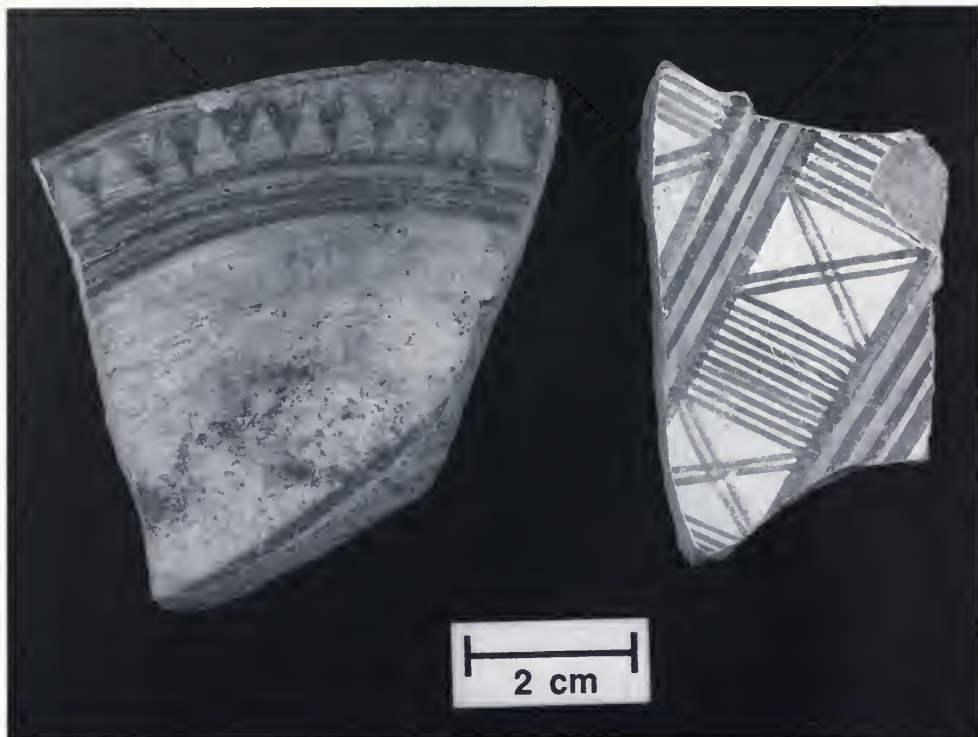


FIG. 23. Local Inca ceramic artifacts from Imicate.

present,¹⁵ corroborating the dates derived from the stylistic comparisons.

The Early Sillumocco settlement pattern in the Juli–Pomata intensive survey area is shown in Figure 30. It is immediately apparent that settlement was heavily concentrated on the lake shore, with fully 85% of the total habitation area located below 4000 m. There are three sites in the *puna* that constitute 15% of the population. It is significant that the largest cluster of Early Sillumocco sites is on low hills in, or on periphery of, the Moyopampa raised-field system. In fact, 41% of the population, as calculated by total habitation area, was located within 1 km of the raised-field areas in the entire intensively surveyed area (Table 3).

The survey data therefore strongly suggest that raised-field agriculture was an important component of the Early Sillumocco economy. Raised fields are also found in the Pomata area and were constructed in the Challapampa zone due west of Pomata as well, near some Middle Formative sites. Furthermore, lacustrine resources were intensively exploited, as evidenced by a large quan-

tity of fish bone in middens excavated from Early Sillumocco components at Tumatamani and Sillumocco–Huaquina.

In summary, the Early Sillumocco settlement pattern is characterized by a lakeside settlement focus, the absence of fortified settlements, a general concentration of a substantial proportion of the population (41%) in the raised-field areas, and a lack of any archaeologically visible formal system of camelid pasturing.

Late Sillumocco Period Settlement Pattern

The Late Sillumocco Period occupies the latter part of the Upper Formative in the Juli area. It is roughly contemporary with Classic Pucara, Tiwanaku I, and Qeya (Tiwanaku III). The Late Sillumocco dates between ca. 200 B.C. and A.D. 400, based on stylistic comparisons to pottery from the north and south Titicaca Basin regions. One C-14 date from an initial Late Sillumocco floor at the site of Palermo dates to $2,180 \pm 80$ years before the present (uncorrected), or 210 ± 150 B.C. (corrected).¹⁶

¹⁵ Teledyne I-17,545.

¹⁶ Teledyne I-17,572.



FIG. 24. Local Inca ceramic artifacts from Imicate.

The Late Sillumocco Period is characterized by a small reduction in the total number of sites and an increase in mean site size (Fig. 31, Table 6). Total population increased, and there was a major concentration of the population in the raised-field areas, increasing from 41% to almost 70% (Table 6). Land use in the *puna* was much reduced; less than 6% of the total population was concentrated in one relatively large site (333). The obvious conclusion from these settlement data is that the natural population increase was directed toward the raised-field areas, with additional existing populations also pulled into this economic activity.

During the Late Sillumocco Period there was a distinctive hierarchy in site sizes, with sites ranging from small type 2 mounds to the large type 1 Tumatumani (001) (Fig. 32) and the impressive type 3 sites of Palermo (212) (Fig. 33) and Sillumocco-Huaquina (158) (Fig. 34). These three sites in particular are characterized by the presence of corporate architecture in the form of artificial mounds, stone enclosures, and/or sunken courts. These sites most certainly represent the elite/ceremonial centers of the Late Sillumocco

polity. Calculation of total habitation area indicates that more than half of the population during the Late Sillumocco Period lived in either the type 1 or type 3 sites, up 20% from the earlier Early Sillumocco Period (Table 6).

There is a strong continuity between the Early and Late Sillumocco settlement patterns. The population in both periods was concentrated along the lake edge, relied to some degree on raised fields, was nucleated in relatively few settlements, and was generally evenly spread along the landscape on the lake edge. Perhaps the most significant observation is that there was an increase in population but a reduction in the number of sites. In other words, mean site size increased and populations were drawn into a smaller number of larger sites.

Tiwanaku Period Settlement Pattern

The Tiwanaku occupation in the region dates from approximately A.D. 400 to 1100. We discovered more than 40 Tiwanaku sites in the Juli-Pomata intensive survey area. The Tiwanaku settle-



FIG. 25. Late Horizon diagnostics.

ment pattern is shown in Figure 35. One of the most striking features of the Tiwanaku settlement pattern is its continuity with the Late Sillumocco pattern. Site location was essentially the same, with lakeside and raised-field areas favored locations. Virtually the same percentage of the population lived in the elite site types in both periods (Table 6). Mean site sizes were very high, and a very large percentage of the population continued to live in the raised-field areas.

Virtually all of the major Late Sillumocco sites continued to be occupied in the Tiwanaku Period, whereas some minor Late Sillumocco sites were abandoned. Most significantly, nine of the ten sites that were abandoned were small. The three elite/ceremonial sites of Tumatumani (001), Palermo (212), and Sillumocco-Huaquina (158) all

continued to be occupied during this period, and sites such as Tumucu (121) were founded for the first time by Tiwanaku, utilizing architectural patterns similar to those seen on the earlier Late Sillumocco Period sites.

Land use patterns between the Late Sillumocco and Tiwanaku periods were similar as well. The distribution of population among the three economic zones—raised field, terrace agriculture, and camelid pastoralism—remained relatively constant (7:2:1 vs. 6:3:1 for Late Sillumocco and Tiwanaku periods, respectively). These data suggest a strong continuity between the Late Sillumocco and Tiwanaku periods, indicating that the Tiwanaku state expanded into an already complex political and economic system dominated by the Late Sillumocco peoples.



FIG. 26. Chucuito diagnostic ceramic artifacts.

In summary, the Tiwanaku settlement pattern is characterized by a lakeside settlement focus and the absence of fortified settlements, very similar to the earlier Late Sillumocco pattern. Most major Late Sillumocco elite/ceremonial sites continued to be occupied in the Tiwanaku Period. At least one of these, Tumatumani, was architecturally enhanced as well. In most respects, the Tiwanaku pattern was an elaboration of the existing Late Sillumocco pattern.

Altiplano Period Settlement Pattern

The first major change in settlement patterning in the Juli-Pomata area after the Late Archaic Period occurred in the Altiplano Period. The Alti-

plano Period settlement pattern is shown in Figure 36. Sites continued to be built on the lake shore, but there was a notable expansion into the higher *puna* zones, particularly up the rivers. Even though the population did not appreciably increase, there is a significant increase in the number of sites. This is the most significant pattern in the Tiwanaku/Altiplano Period transition; the nucleated settlements of the Late Sillumocco and Tiwanaku periods gave way to a dispersed settlement pattern. Average site size decreased by a factor of three from the Tiwanaku to the Altiplano Period. For the first time as well, there was major occupation of single-household hamlets in the pampas, as represented by the type 2 small mounds that abounded in the Altiplano Period (Table 6). The percentage of the population living



FIG. 27. Pacajes diagnostic ceramics.

in single households in the pampas increased by a factor of two from the previous Tiwanaku Period, even though the total percentage of the population living in the raised-field areas decreased dramatically (Table 6).

Another prominent feature of the Altiplano Period settlement pattern is the development of hill-top fortified sites, or *pukaras* (Table 7). We located nine fortified sites in the Juli-Pomata intensive survey area. Fortification walls are found at the site complex named Pukara Juli (including sites 003, 005, 006, and 188), on the Sapacollo hill (019), at the large hill located due northwest of Pomata (416), and at two major sites, Suankata

(007) and Tanapaca (481), that fell just inside of the survey area.

Analysis of the settlement data indicates that there are two distinct types of fortified sites. Pukara Juli is typical of the first type—very large hills surrounded by at least three walls, with substantial architectural remains inside and immediately adjacent to the walls. These major *pukaras* encircle huge areas. To date, we have identified six of these sites in the south and southwestern Titicaca Basin—Pukara Juli, Tanapaca, Llaquepa, Huichajaja, Tanka Tanka, and Cerro Carajuana. Hyslop (1976) described four of these sites—Pukara Juli, Llaquepa, Huichajaja, and Tanka Tanka.



FIG. 28. Archaic lithic artifacts.

Likewise, Vásquez et al. (1935) first reported Tanka Tanka.

The second type of *pukara* is characterized by small hills with surrounding defensive walls and very little architectural remains. These minor refuge sites are built in a manner similar to the major ones, but they are considerably smaller and much more numerous (Fig. 37). They rarely have more than a few structures, and artifactual remains are meager. The available data indicate that the minor *pukaras* were not permanently occupied. There were no permanent habitation structures, and there is little evidence of intensive use.¹⁷

The survey provides data on the distribution and frequency of minor refuge sites and contemporary nondefended settlements near the refuge sites. Minor refuge sites are distributed among numerous undefended villages and hamlets. We hypothesize that major *pukaras*, minor *pukaras*, and

undefended sites composed the Altiplano Period settlement pattern. This settlement pattern is dramatically distinct from the preceding Tiwanaku pattern and represents a profound change in the political and economic organization in the Altiplano Period.

The distribution of above-ground tombs closely parallels that of the habitation sites (Fig. 38). The survey failed to discover any major *chulpa* cemetery areas. Rather, the above-ground tombs appear to conform to a pattern of territorial marking, as suggested by Hyslop in 1976. These data could be interpreted to suggest the formation of distinct political-geographical units in this period, each associated with one major and possibly one or more minor refuge sites. In this case, the set of sites in the Juli area, including the San Bartolomé hill, would correspond to one of these groupings. Likewise, the sites in the El Molino/Challapampa area would compose another. This pattern is discussed in greater length in the discussion section, pages 117–118.

¹⁷ We therefore did not include the minor *pukaras* in the total habitation area calculations in the tables.

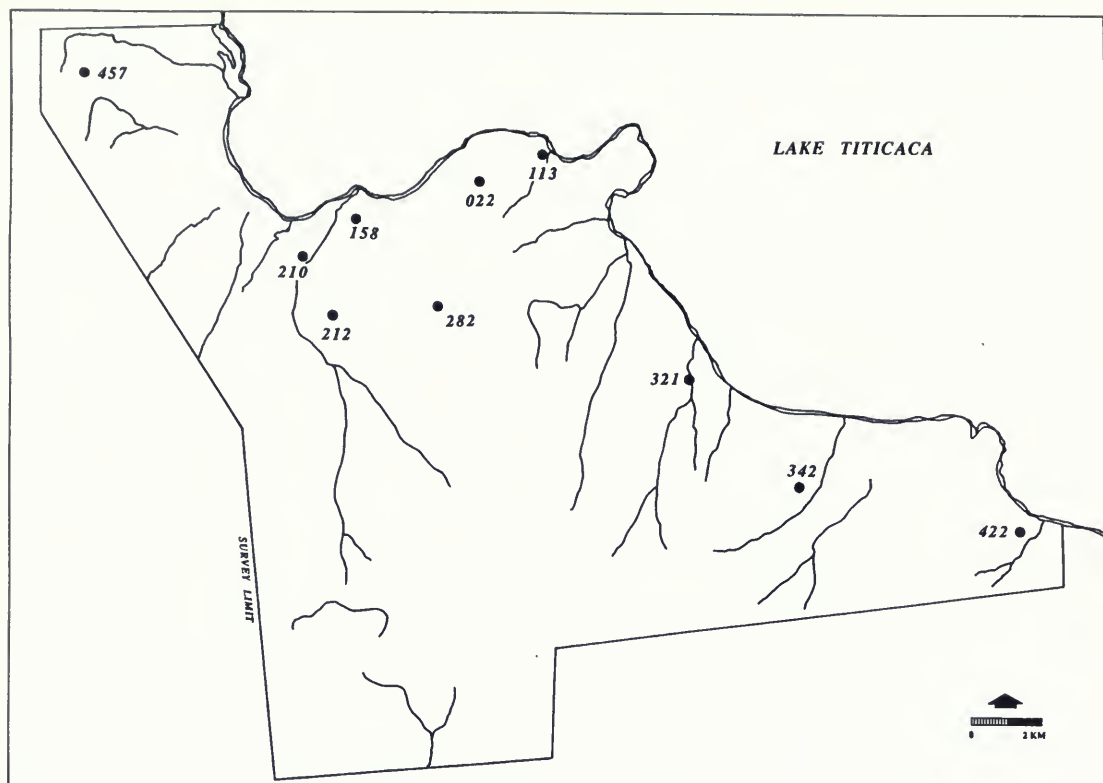


FIG. 29. Distribution of Pasiri habitation sites.

Expansive Inca Period Settlement Pattern

The Expansive Inca Period settlement pattern is shown in Figure 39. In many ways, the transition from the Altiplano to the Expansive Inca Period is similar to the change between the Tiwanaku and the Late Sillumocco Period. That is, the Inca occupation does not represent any dramatic change from the Altiplano Period. The difference is one of degree, not kind. Mean site size is only slightly higher than that of the Altiplano Period, increased by the founding of the large urbanized centers such as Juli and Pomata. The clear settlement choice during the Expansive Inca Period is near the lake. However, the movement into the *puna* that began in the Altiplano Period continued in the Late Horizon Period. About 14% of the population was living above 4000 m under Inca occupation. Likewise, the shift away from the raised-field areas continued, with the result that 85% of the population lived in the terraced agricultural areas or on the camelid grazing lands (Table 3).

The main differences between the Altiplano and the Expansive Inca Period are the greater number of sites, abandonment of the fortified refuge sites such as Pukara Juli, and the founding of several regional political centers: Juli (002), Pomata (004), and possibly the Kajje region. The Late Horizon witnessed a "spike" in the population of the region. Extrapolating from the previous population growth rates, there was about twice the population during the Late Horizon than expected. These data suggest that populations were moved in the region under Inca control, a process consistent with ethnohistoric data on Inca mitimae in the region (Julien, 1983).

One final note is that the location of Juli and Pomata as major Early Colonial political and religious centers appears to have been based largely on the existence of already large populations during the Late Horizon. Our data strongly suggest that the decision to intensively settle Juli and Pomata during the Early Colonial Period reflects the demographic and cultural-geographical landscape left by the Inca state much more than it reflects a

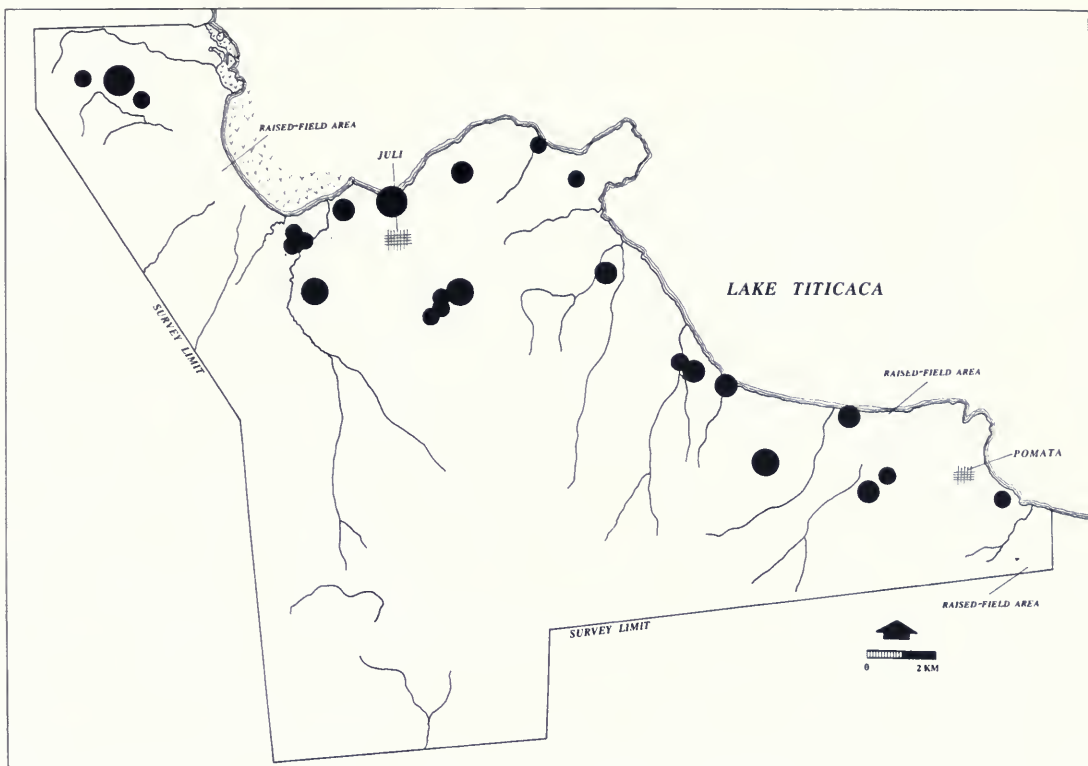


FIG. 30. Site size distribution of Early Sillumocco settlements.

new administrative order imposed by Spanish authorities.

Early Colonial Period Settlement Pattern

The settlement pattern during the Early Colonial Period in the Juli-Pomata survey area is very similar to that of the Late Horizon. There are fewer sites in total, and the absolute population is lower, but the settlement distribution is approximately the same as in the Late Horizon. Mean site sizes and overall population distributions were very similar to those of the Late Horizon (Tables 3 and 6). Interestingly, the highest density of settlement in the *puna* is in the Early Colonial Period (25% of the population, as seen in Table 3), suggesting a very high reliance on camelid pasturing during this time. The substantial number of Early Colonial sites in the *puna* may also help explain the location of the impressive Early Colonial church at the site of Lundayani (009).

Population Trends in the Juli-Pomata Intensive Survey Area

Population trends in the region provide an excellent index of the settlement history of the southwestern Titicaca region. The calculation of population size from settlement data is one of the most difficult and contentious problems in archaeology today (e.g., see Parsons et al., 1982, pp. 69–70). We believe that calculations of total site size provide a reasonable indicator of population size. For the intensive survey zone, we can provide an accurate characterization of the population history in the prehistoric and early historic periods.

Figure 40 is a graph of the population growth in the area using several different correction methods. The uncorrected data are expressed as total habitation area in hectares per period. These base data were corrected for length of time period, average household life of 60 and 90 years, differential densities of nucleated sites with 20% and 40% population increases, and combinations of these factors. In virtually all cases, the shape of

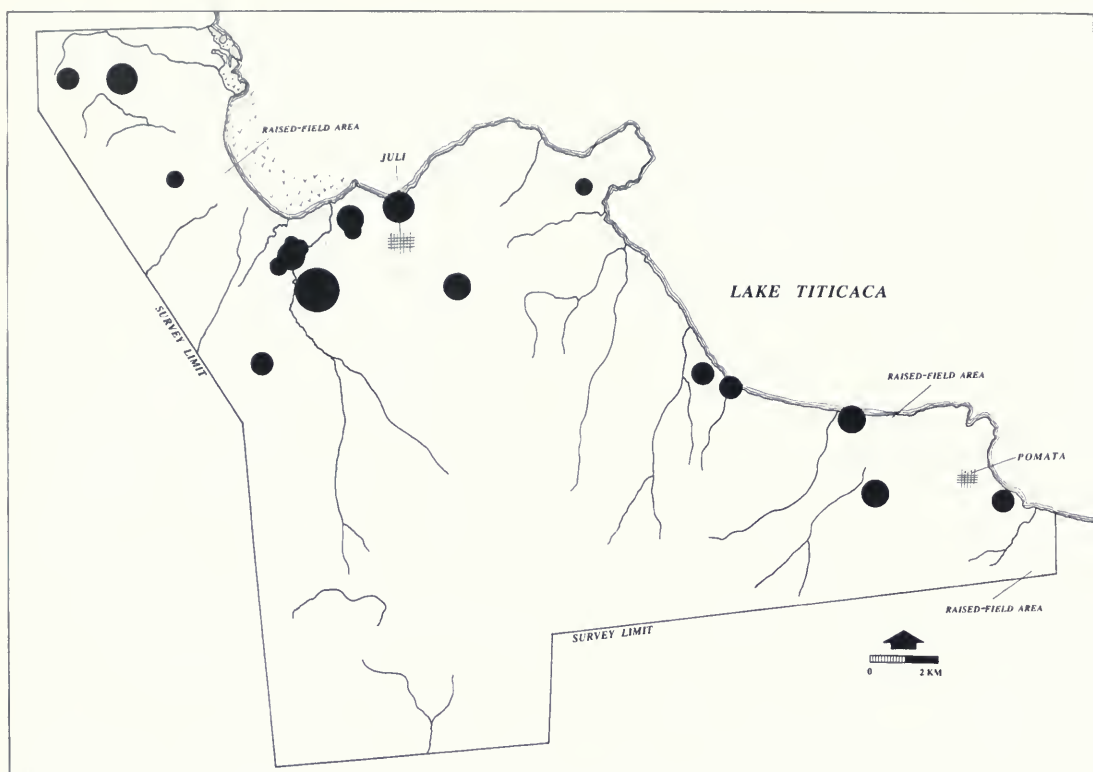


FIG. 31. Site size distribution of Late Sillumocco habitation sites.

the graph is the same. In other words, the data appear to be highly robust in the sense that even with extreme corrections for a variety of factors, all curves are similar. The steady curve from the Early Sillumocco Period to the Altiplano Period suggests that future research that might divide the sequence into finer time periods would not alter the curve. It furthermore supports our phasing of the sites and corroborates our ceramic chronology, even with the relatively large time periods that we are unfortunately forced to use at the present time.

The population curve in the intensive survey area is extremely important for understanding pre-historic cultural developments in the region as a whole. The growth rate indicates a relatively steady population increase from the earliest occupation to the Altiplano Period, with a noticeable growth spike in the Expansive Inca Period and a definite drop during the Early Colonial Period. Initial agricultural populations were sparse and located along the lake edge. The population continued to grow in the subsequent Upper Formative and Tiwanaku periods. During the Altiplano Period, there was a slight leveling in population lev-

els, but no dramatic shift in overall levels relative to the preceding periods. Only during the Inca Period can we detect a substantial increase in population well beyond that expected from normal population growth.

Major Sites in the Juli-Pomata Intensive Survey Area

Aceruni Amaya (375)

This cemetery consists of at least eleven field-stone *chulpas* that are found on the sides of the hill next to the Chutani Pampa. These *chulpas* date to the Altiplano and Late Horizon periods. The site is in the community of Huacani. The area included in this site measures approximately 200×100 m. These *chulpas* are well conserved, and some are up to 3.0 m high. Most are round and range in diameter from 2.0 to 4.0 m. One *chulpa* is square in shape and 2.5 m on a side. One *chulpa* has two snake motifs in bas relief. This area

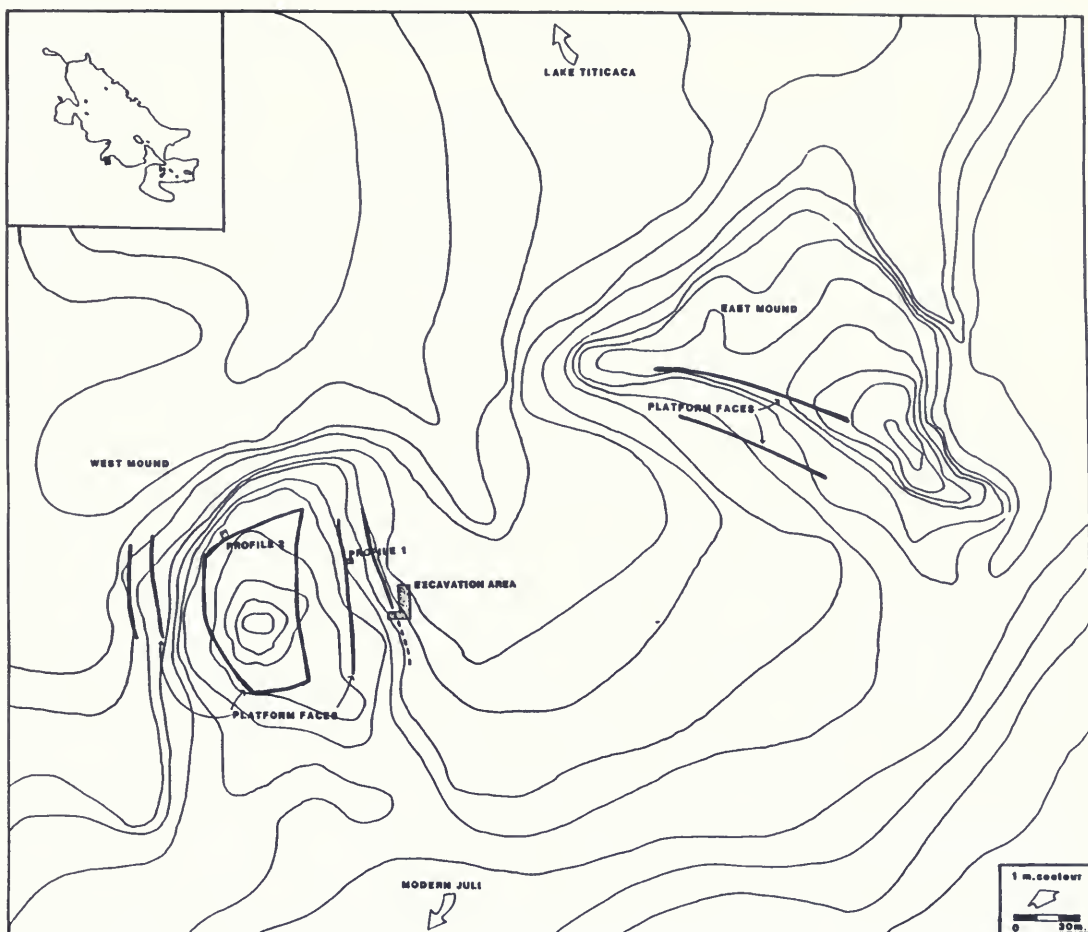


FIG. 32. Site of Tumatumani.

represents one of the major Altiplano and Late Horizon Period *chulpa* cemeteries in the survey area. It was first reported by H. Tschopik in his 1951 report (p. 506).

Altarani-Bebedero (457) (Figs. 41–44)

This site consists of the entire Bebedero outcrop, with an adjoining artificial platform on the southern side. The platform is a few meters above the pampa, and it is difficult to determine without excavations how much of it is artificial or altered natural features. There is also the famous carved niche on one of the rock outcrop walls. Ceramic densities on the site are quite high.

The Bebedero is a large uplifted rock outcrop that is unique in the survey area, with Late Archaic, Pasiri, Early Sillumocco, Late Sillumocco,

Tiwanaku, Altiplano, and Inca occupations. It consists of a series of domestic terraces built into vertically tilted geological strata. The terraces do not have any surviving architecture that is apparent at the present time. Densities of artifacts, however, are very high on some of these terraces, possibly as a result of secondary redeposition processes. This site is impossible to classify due to its unique geological features. Most of the domestic areas would have been on artificial terraces. The formation is at least 2 km long, and we surveyed the southern half. There are pockets of artifactual remains throughout these uplifted rocks.

Altarani was first discovered by Hyslop (1976, p. 352; 1977, p. 161). His description matches our survey observations, except that we have included the entire Bebedero rock outcrop with the platform and carved niche as one site. The carving is

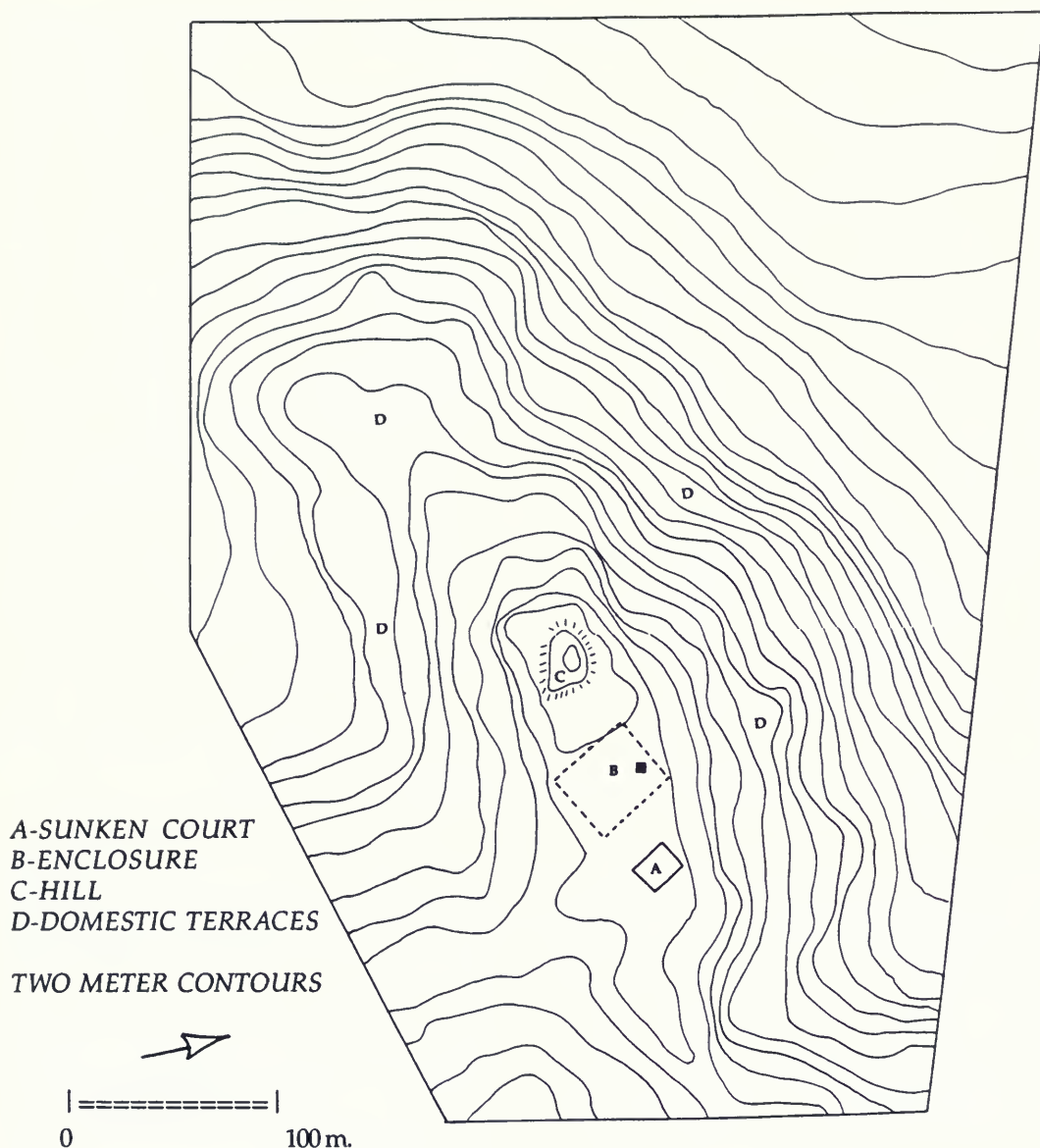


FIG. 33. Site of Palermo.

best described as a small inverted trapezoidal or T-shaped niche inside of an upside-down square U shape. It is geometric in form. The carving is about 7 m high and 14 m wide.¹⁸ The carving is

¹⁸ Hyslop (1977, p. 161) stated that the niche is 7 × 8 m wide. However, he appears to have not included the unfinished carving flanking the deeper niches in his width estimate. The total width of the carving is 14 m, whereas the width of the inverted U is consistent with Hyslop's original measurements.

unfinished, suggesting that the site was abandoned during the preparation of this niche. This is evidenced by the uncompleted flanking section on the north side of the cut stone face. If the niche was an Inca construction, it is possible that the Inca architects abandoned their work at the time of the Spanish conquest. Hyslop (1977, p. 161) argued that the niche represented a carved *chulpa* facade constructed in the Altiplano Period. We believe that this supposition is not established and



FIG. 34. Site of Sillumocco-Huaquina.

that the carving could be associated with the probable cut stone at the northern end of the site, built in a supposedly Inca style. There is, of course, an Inca occupation at this site. Alternative hypotheses include that of Hyslop (1977), or that the carving was completed during the Tiwanaku or Late Sillumocco Period, the major occupations of the platform area of the site. Hyslop himself notes that the “doorway has a T-shape reminiscent of a Tiwanaku sculptural motif” (Hyslop, 1977, pp. 161–162).

Chinchin Jalave (017)

Located at the northernmost tip of the San Bartolomé peninsula, Chinchin Jalave has one of the most spectacular views of the lake and a commanding view of the Bolivian cordillera and the Isla del Sol. Today, the site is composed of a series of low agricultural terraces that follow the relatively gentle contours of the hill. The area is virtually uninhabited today. Several (at least three) slab-cist tombs are found on the site. There

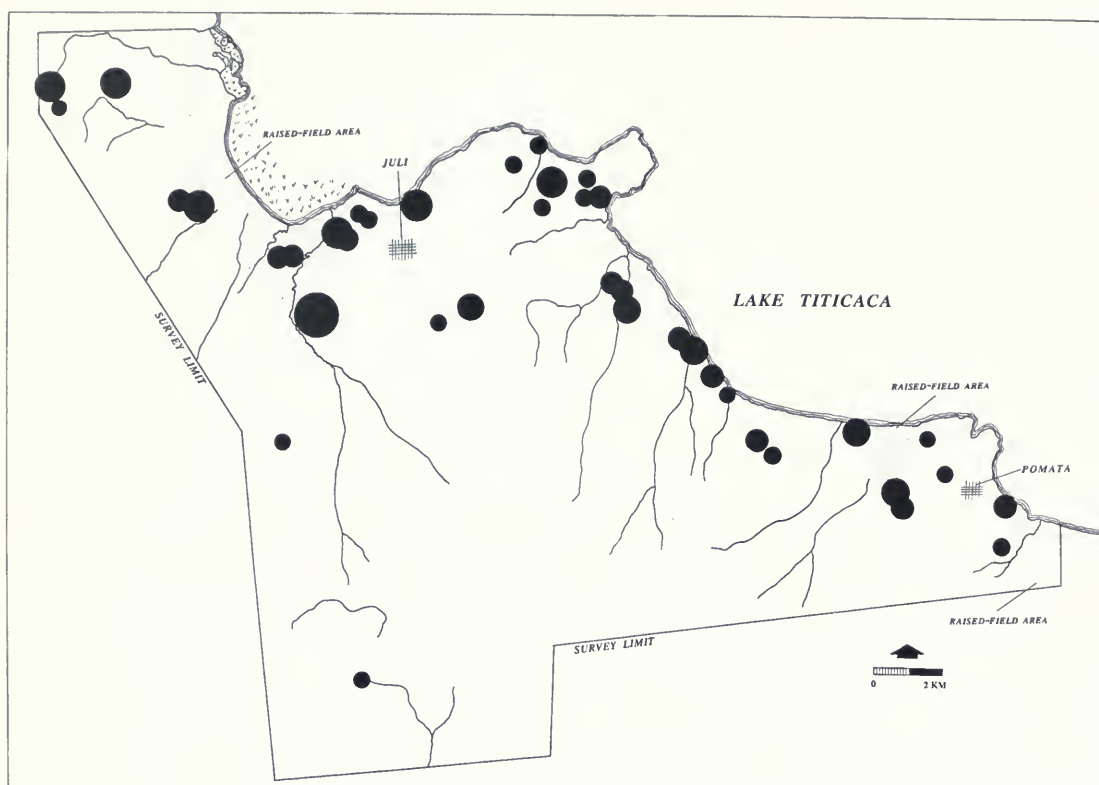


FIG. 35. Site size distribution of Tiwanaku habitation sites.

are also a number of rock piles that could have been built over fallen *chulpas* or slab-cist tombs. This is a dispersed site with a very low density of artifacts. Chinchin Jalave probably represents a number of Late Horizon and Early Colonial hamlets or individual households that moved over the generations. There is no visible architecture on the site today.

Chukusuyu (137)

This site includes domestic terraces, with a relatively high concentration of artifacts on the surface from the Middle Formative to the Inca periods. It is very close to the lake, and there are substantial *totoras* stands at the edge of the site. The site was originally discovered by Hyslop (1976, p. 373). He described it as a habitation area of about 2 ha, with two igloo *chulpas* and one slab-cist tomb. Our methodology recognized four separate sites (127, 133, 136, 137) that Hyslop (1976) had lumped as a single site. We did not locate any *chulpas*. It would appear that these had

been leveled for agricultural activity since Hyslop's (1976) survey. It is also possible that surface stones in the area were utilized for road construction in the mid-1980s.

Hyslop noted that the site name of Chukusuyu was mentioned in the Garci Diez (1964 [1567]) *Visita* as part of the subdivision of Juli. He suggested that the site that he found was this historically documented settlement. Our survey located a substantial number of Late Horizon settlements on and near the Chukusuyu Peninsula, any of which could reasonably be the Chukusuyu community listed in the *Visita*.

Hanco Vilque (333)

This site has occupations including Early Sillumocco, Late Sillumocco, Tiwanaku, and the Altiplano periods. It is located at 4100 m.a.s.l. Hanco Vilque is the highest pre-Altiplano Period site in the intensive survey area. It measures approximately 150×150 m. The site consists of at least four large (approximately 15×50 m)

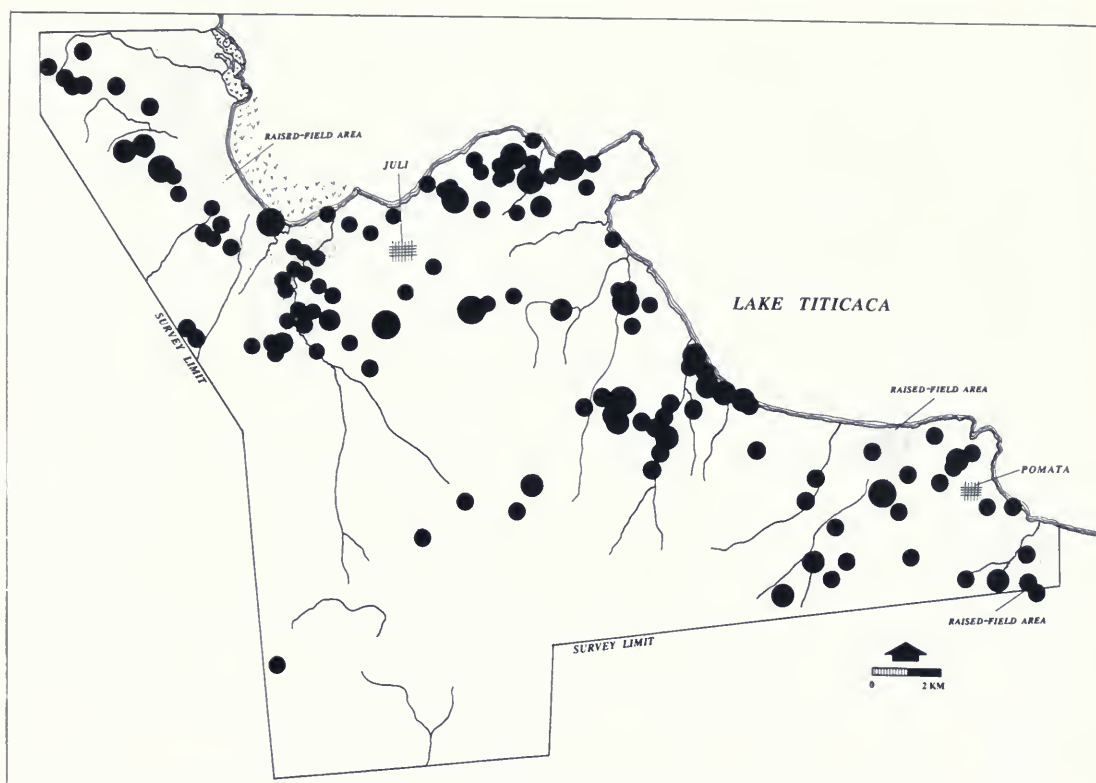


FIG. 36. Site size distribution of Altiplano Period habitation sites.

artificial terraces that descend onto a set of existing round structures. These round structures measure approximately 20 m in diameter. Associated with this habitation area are at least two separate cemetery areas. In one cemetery area there are at least ten cist tombs that average between 0.60 and 1.20 m in diameter. This area was separately surface-collected, and we found only

Tiwanaku pottery. There is also a single round, 1.20-m-diameter *chulpa* built with fieldstones. We discovered no associated ceramic artifacts with the *chulpa*.

This site is significant because it is located in the *puna* ecological zone. The large round structures most likely date to the last major occupation of the site, the Altiplano Period. The round shape

TABLE 7. *Pukaras* and other nonhabitation sites in the Juli-Pomata intensive survey area.

Site No.	EC	LH	ALT	TIW	UF	MF	Size	Type	Name
003		?	x				15.00	4/5	Yacari-Tuntachawi
008			x				0.75	5	Suankata
019	x	x	x				0.50	5	Zapacollo
023			x				2.00	4/5	Unnamed
195	?						0.04	5	Capilla Caracolla
388			x				2.00	5	Calluchirisa
416	x	x	x				0.49	5/8	Unnamed
435	x	x	x				0.50	5	Yaureca
481	x		x				?	5	Tanapaca
496	x	x					100	6	Pucara Apacheta

Hypothetical settlement pattern of Altiplano Period sites

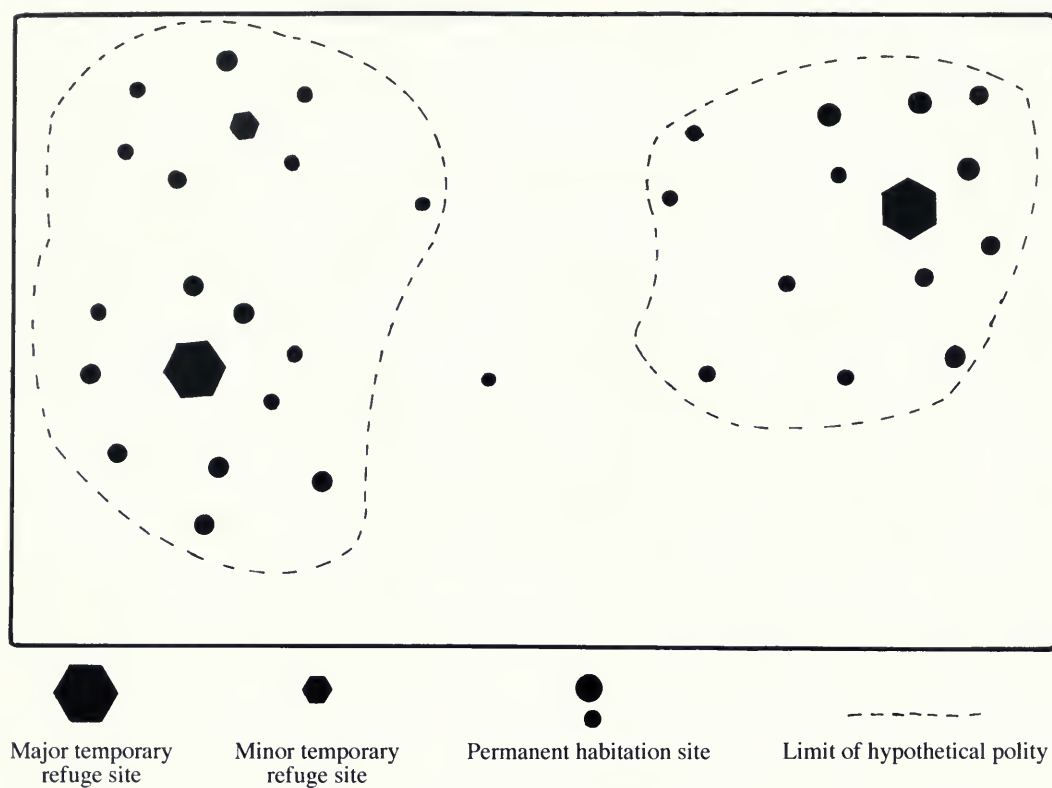


FIG. 37. Hypothetical distribution of Altiplano Period sites.

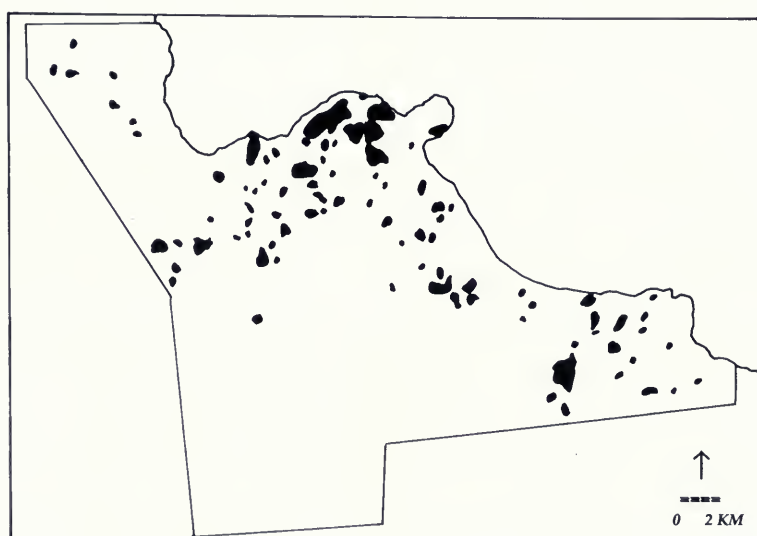


FIG. 38. Distribution of above-ground tombs in survey.

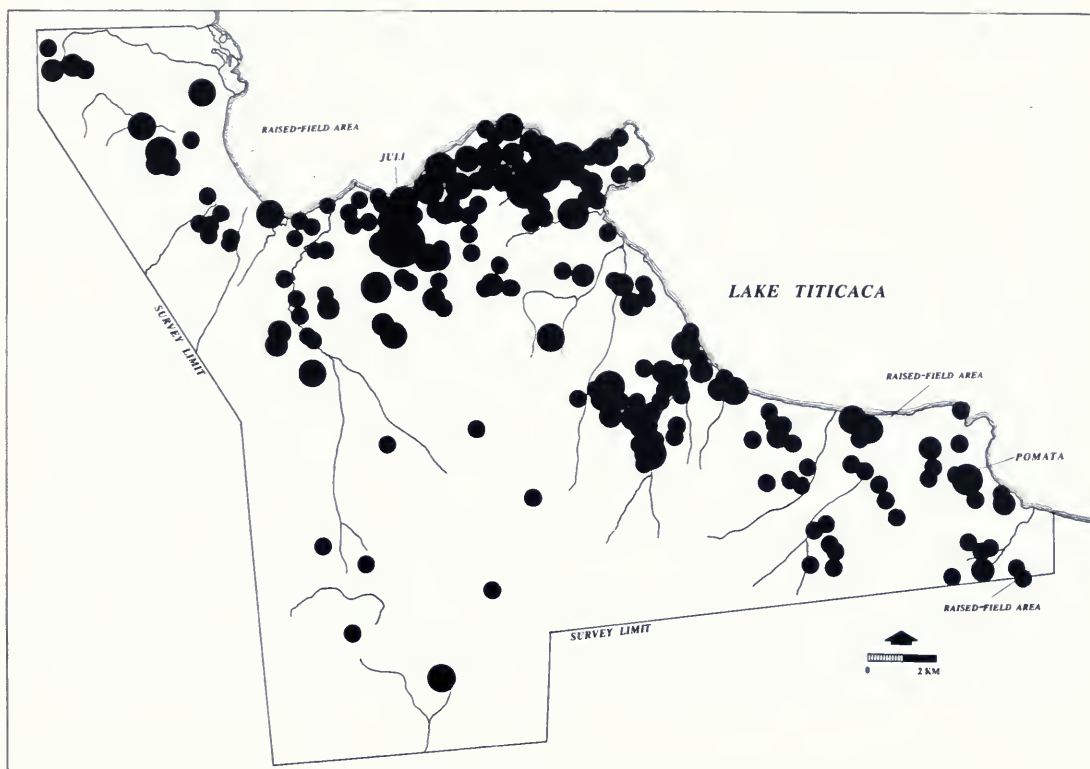


FIG. 39. Site size distribution of Late Horizon habitation sites.

of the structures is consistent with similar domestic residences on other major Altiplano Period sites. Hanco Vilque represented a high-altitude pastoral site during the Early Sillumocco through Altiplano periods.

Huaquina (210)

This is a type 1 mound site characterized by a large platform mound with at least three smaller mounds on top. The site is in the pampa area seen in Figure 45. The mound area proper measures approximately 50×50 m, with associated artifact scatters extending over a 100×150 -m area. At approximately 1.5 ha, Huaquina would be only one-third the size of Tumatumani (001). However, as at Tumatumani, there is evidence of elaborate corporate architecture at the site in the form of cut stone on the surface. There is also a large sunken section on the mound that could represent a semisubterranean sunken court. Unlike Tumatumani, there is a Pasiri Period occupation at the site.

There is a well dug on the edge of the mound that shows a 1.5- to 2.0-m-deep midden or fill section. It was not possible to scrape the side of the well to determine whether it was stratified. There is no doubt that the exposed section was cultural. These levels could be similar in function to the platform fill in Tumatumani. We found a trumpet fragment that one of us (Steadman) has identified as part of a locally manufactured trumpet, a Late Sillumocco diagnostic. A large number of lithic artifacts were also recovered, with hoe and adze types similar to those recovered at Sillumocco-Huaquina and Tumatumani. The distribution of these artifacts was somewhat constricted in that there was an area of high lithic density and there were other areas with few or no lithic artifacts.

Juli Pueblo (002) (Fig. 46)

The great Inca administrative center of Juli Pueblo is today the modern town of Juli. The site is listed in the *Garci Diez Visita* of 1567 as a

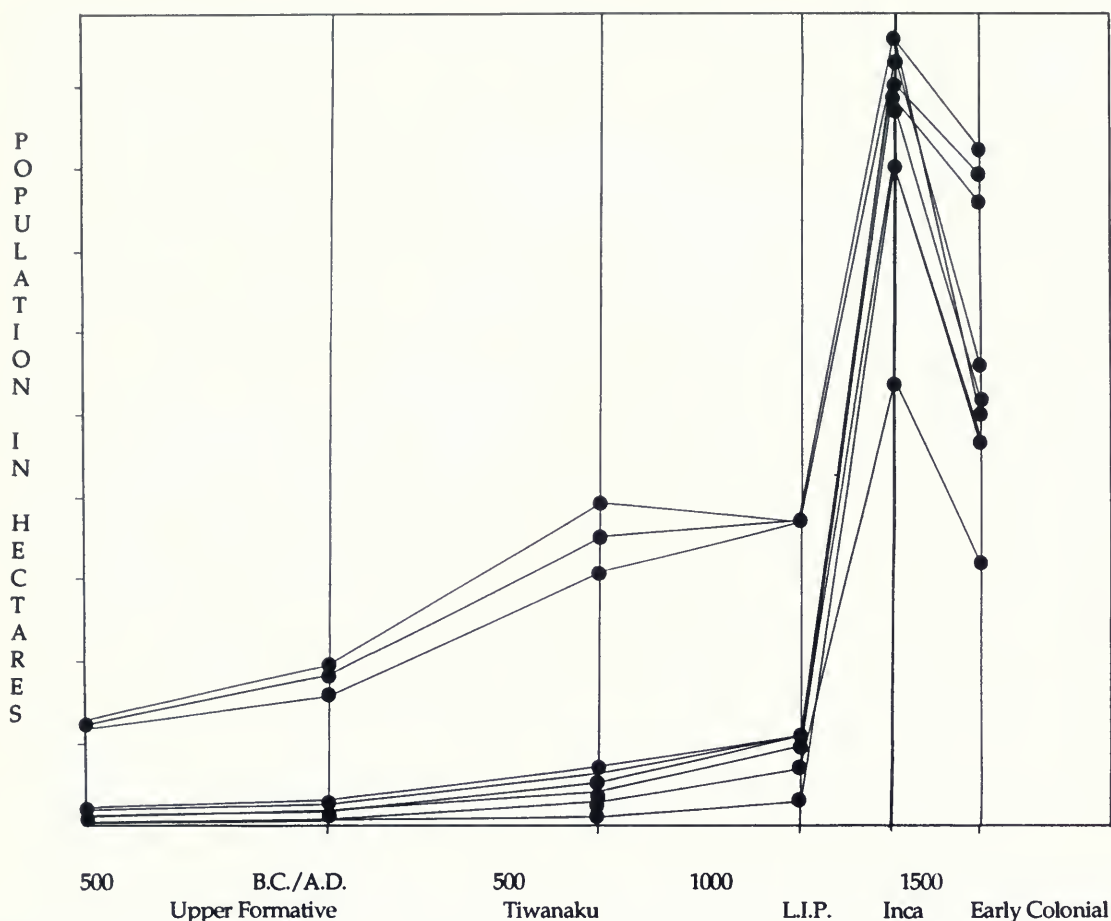


FIG. 40. Population graph.

major Lupaqa *cabecera* in the region. Hyslop discussed the site in his dissertation (1976). The site is almost exclusively Late Horizon and Early Colonial in date. We estimate the size of the site to be substantially larger than Hyslop's estimate. Based on observations of pottery in the streets and in modern construction disturbances, we believe that the site is approximately 20 ha in size. A large collection of diagnostic materials has been collected from the streets of Juli. There are no pre-Inca pieces in the collections, with the possible exception of two fiber-tempered pieces from the south side of town. These could represent an Early Sillumocco Period occupation in this part of Juli, but two sherds represent an insufficient percentage of the total collection to assign an Early Sillumocco occupation to the site.

Kalatirawi (208)

This moderately sized type 2 mound, approximately 20×30 m in dimension, is located in the Moyopampa near the Rio Salado. It was occupied from the Early Sillumocco to the Early Colonial Period. It is not an artificially constructed platform mound like Tumatumani (001) or Huaquina (210). Rather, it most likely represents a series of collapsed structures over at least two millennia. The site is very significant because it contains diagnostic ceramics from all periods in the Juli-Pomata region. There is no surviving architecture on the site. We did discover a single andesite rock, approximately 0.40×1.00 m in dimension, near the mound. The rock was too badly eroded to determine whether there was any carving on it. It



FIG. 41. Bebedero rock outcrop.



FIG. 42. Site of Altarani-Bebadero (457).



FIG. 43. Cut stone "doorway" at Altarani.



FIG. 44. Cut stone "doorway" at Altarani.



FIG. 45. Site area of Juli with Sapacolla in background.



FIG. 46. Site of Juli.

was located in a raised-field zone. This site type is very rare in the pre-Altiplano periods.

Kollini (103)

This site is composed of a series of large terraces that measure from 20×30 to 40×50 m in dimension. A large wall surrounds the lower three sides of the site. Some terraces are outside of the wall. The wall actually consists of two smaller walls filled with rock rubble, a building technique typical of Altiplano Period sites in the area. This wall may therefore have served a defensive purpose. There are approximately 10–15 circular fieldstone *chulpas* and/or slab-cist tombs on the site. The *chulpas* average 2.0 m in diameter. This site, combined with sites 102, 104, and 105, may be considered one large settlement during at least the Altiplano and Late Horizon periods. It is possible that this settlement complex derived from the earlier Tiwanaku settlement from the nearby site of Tumuku (121).

Lundayani (009)

Lundayani was first identified by Hyslop (1976, pp. 377–380) as a major Inca and Spanish Colonial Period site. There is some cut stone near Lundayani that may be the location of a hot spring near Juli (an Inca bath) mentioned by Bertonio in his dictionary as *Huntto uma*: “hot springs or baths in the puna” (1956[1612], Book 1, p. 85). The site is located between two *quebradas*. It contains a number of standing structures, including round and rectangular ones that led Hyslop (1976) to suggest that it could have been a “reduction” of some indigenous Lupaca populations by the Inca state. This is because rectangular structures are typical of Inca domestic construction, whereas round structures were typical of pre-Inca Lupaqa construction (Hyslop, 1976; Stanish et al., 1993).

Lundayani has perhaps the earliest Christian church in the Juli region. It is built in a classic Early Colonial church style with adobe and bricks. The significance of Lundayani for the Early Colonial and Inca history of the Juli region cannot be overstated.

Mogote (403)

This important Inca site has at least 15 small, round, domestic structures. The structures are ap-

proximately 10–15 m from each other and range from 2.5 to 4.0 m in diameter. There are also at least three circular fieldstone *chulpas*, with diameters of approximately 2.5 m. The *chulpas* and the habitation structures are distinguished from each other by the construction techniques and the characteristics of the foundations.

This site is significant because it is a single-occupation Late Horizon site with domestic architecture that is much more characteristic of the preceding Altiplano Period. It therefore constitutes good evidence that the local populations during the Inca occupation continued to build domestic structures in a local, traditional style. This would contrast with sites such as Lundayani, where both round and rectangular structures are found in the Late Horizon.

El Molino (261)

The site of El Molino is built on a low, broad hill in the Molino section of the survey zone. It covered an area of about 1 ha during the Tiwanaku Period, the principal occupational period of the site. The site is close to the Rio Molino and is composed of a number of low, wide domestic terraces. It represents a modified type 4 site, with a set of domestic terraces built on a very low gradient rise. It is in a centralized location in the El Molino area and has had a substantial and long occupation throughout the sequence. There is no surviving domestic architecture from the site, with the exception of the badly eroded and worked terraces. There is no evidence of corporate constructions. This site represents a large nonelite settlement from the Tiwanaku Period found in the intensive survey area.

Moyopampa Playa (221)

This site consists of five type 2 mounds spread over a 2-ha area in the Moyopampa raised-field zone. The mounds are approximately 5.0 m in diameter. These mounds are located today about 50 m from the lake in an area subject to periodic inundations. We collected from each mound separately. One important observation from these collections is that the mounds contain a large quantity and range of artifacts from the Altiplano to the Late Horizon periods. Collections such as these assure us that the surface artifacts represent the subsurface materials in most of these mounds.

These mounded sites typically began in the Altiplano Period, although a few type 2 mounds contain evidence of Tiwanaku occupations. One of us has argued that site locations such as these indicate the gradual collapse of the raised-field system (Stanish, 1994). The larger and more complex aqueduct, canal, and field systems of the Tiwanaku and Upper Formative periods contracted in the Altiplano Period. These smaller agricultural systems were characterized by small households, as represented by these mounds, that may have been located next to small blocks of raised fields near the lake and along the rivers. In other words, during the Altiplano Period, the raised-field agriculture was most likely organized at the household or *ayllu* level, and no higher. Sites such as 221 are typical of this settlement pattern, associated with a relatively noncomplex organization of raised-field production in the region.

Palermo (212) (Fig. 33)

The site of Palermo is located directly between two aqueducts that feed the raised fields. It is the largest Early Sillumocco, Late Sillumocco, and Tiwanaku Period site in the Juli–Pomata area. It is the center of the Early and Late Sillumocco polity in the region, equal in political importance to the site of Ckackachipata in the Chatuma area (see below).

The site is located on the northwest side of Pukara Juli, adjacent to an old hacienda that lends its name to the site. Palermo is a classic example of a type 3 site, with massive domestic terraces that climb up to an artificially altered hilltop. There is a semisubterranean sunken court at the top of the hill that measures 15×15 m. The court is lined with shaped but uncut stones. The court contains a stone doorway very similar to that found at Lukurmata in Bolivia (Bermann, 1994) and at other sites in the Titicaca region, most notably Incatunuhiri.

Above the sunken court is an open area, approximately 50×50 m in size. Today, part of it serves as a corral, but numerous large stones around the site suggest that it was a stone-walled enclosure. This enclosure is hypothesized to have functioned like a “*kalasasaya*” area adjacent to the sunken court. A large stone monolith is located at the base of the site, at the entrance of the hacienda. As with comparable elite sites in the region, it is likely that this monolith was originally located in this enclosure area or in the sunk-

en court. The monolith is large, about 3.5 m in length, and tapered at one end. The size of the monolith suggests a Tiwanaku date, but there is no obvious carving on the three exposed sides.

At the very top of the site is a small, rounded hilltop that has been artificially altered. The hill is a few meters high, with no obvious constructions at the present time. The effect of the sunken court, enclosure area, and this hill replicates the Akapana–Kalasasaya semisubterranean court at Tiwanaku and suggests a standardized architectural pattern for sites of this time period. The same three architectural elements are found in other sites in the region, such as Sillumocco–Huaquina and Tumuku. On top of this local variety of an “*akapana*” is a circular fieldstone *chulpa* that obviously postdates the major occupation of the site and is most likely Late Horizon or Altiplano Period in date.

The “*kalasasaya*” area was excavated during the 1991 season. We discovered about a meter of construction fill below a clearly defined floor. A single C-14 date from this subfloor fill dates to 940 ± 110 B.C. (corrected), indicating that the fill came from a very early Early Sillumocco context. The ceramic diagnostics in this fill were consistently Early Sillumocco in date. A single C-14 date from the floor surface dates to 210 ± 150 B.C. (corrected), a time falling at the beginning of the Late Sillumocco Period. Again, the artifact assemblage was consistent with the C-14 date, being Late Sillumocco in style. Above this floor was a level of unconsolidated midden, a substantial quantity of burned vegetal matter, and larger rocks. A number of Tiwanaku sherds were found mixed in these upper levels.

The burning episode occurred during or after the Late Sillumocco Period, possibly at the time of Tiwanaku occupation. All of the features at this level were suggestive of postoccupational unintentional collapse. The burning may represent a violent episode in which structures on the floor surface were destroyed. Although tenuous, these data suggest that the Tiwanaku occupation was accompanied by the destruction of the existing ceremonial area. The substantial Tiwanaku occupation of the site, as evidenced by the widespread distribution of Tiwanaku pottery, indicates a substantial reuse of the site.

Higher up in this post-floor level was a thick lens of camelid dung, a feature indicating that the site was utilized as a corral after the principal occupation represented by the floor. This interpretation is supported by the existence of a canal that

runs from the side of Pukara Juli into the sunken court area. This level is most likely associated with the post-Tiwanaku occupations of the site.

This site in Palermo (212) is located between two major aqueducts that lead into the raised-field area immediately below the site. The aqueducts are not used at present, but one runs to a spring that is used today by a church-run agricultural research station. The spring is used to water the entire station and produces a large quantity of water throughout the year. The second aqueduct is on the other side of the site. Palermo was the largest Middle Formative, Upper Formative, and Tiwanaku site in the region. Its association with the raised fields emphasizes the importance of this agricultural technique in the economy of these societies. Palermo was unquestionably the population center of the Juli area prior to the Altiplano Period.

Palermo Pampa (243)

This site consists of 14 mounds, most of which were typical type 2 mounds; a few appear to be rock piles. The mounds contain Altiplano and Early Colonial Period pottery at the surface. The site covers an area of about 70×70 m in the pampa in front of the site of Palermo (212). Most of the mounds are round, although some are irregular in shape. The mounds are high, with several reaching 2.0 m in height. Like many other mounds in the pampa, these habitations are in an old raised-field area. What is most significant about this site is that some of the mounds are located on top of the aqueduct structures clearly associated with the site of Palermo (212). All of the mounds are located in the flow directions of the aqueducts, indicating that the aqueducts were out of use at the time of mound occupations. This is direct evidence of the collapse of formal systems of raised-field agricultural organization after the collapse of Tiwanaku control in the region. We noted the existence of agricultural implements, such as stone hoes and flakes, on the surface.

The site appears to be a small Altiplano Period village that was on or at the edge of a former major raised-field zone. The site does not contain evidence of a Late Horizon occupation. Some Early Colonial sherds were recovered from the site, but these are most likely from intrusive tombs located in the mounds themselves.

Pomata Pueblo (004)

Pomata is one of the *cabeceras* listed in the Garcí Diez (1964[1567]) *Visita*. It is a major Late Horizon and Early Colonial population center. We estimate a total site size of approximately 5 ha, based on the distribution of Late Horizon pottery in the streets and disturbed areas of the town. Pomata was therefore about four times smaller than Juli in the Inca Period.

Pukara Juli, Sector Yacari–Tuntachawi (003) (Fig. 47)

Yacari–Tuntachawi is a section of the Pukara Juli complex, the large fortified site that looms over the modern town of Juli pueblo. Along with other sites located along the side of the hill, 003 represents one of several habitation areas along the base and up the hill of the *pukara*. Pukara Juli is one of the major refuge sites of the Altiplano Period in the region. The site was mapped by one of us in 1988 (Frye), and a large domestic terrace was excavated by another co-author of this monograph (de la Vega, 1990). Excavations at the site revealed a very ephemeral occupation. In fact, the data from this work led de la Vega to first propose that the large *pukaras* such as Pukara Juli were not permanently occupied but represented refuges in times of danger. As discussed below, our survey suggests a slight modification of this hypothesis: that the large *pukaras* were permanently occupied along the base of the walls, with temporary refuge structures higher up. The minor *pukaras*, in contrast, were not permanently occupied.

Palluni (310)

This site contains some of the few standing Inca *colcas* in the survey zone. The *colcas* are classically rectangular in shape, characterized by an exterior wall that measures 4.0×12.0 m, with regular internal divisions. The structures are remarkably well preserved. There was no ceramic material near the *colca* at Palluni. The site also had four circular fieldstone *chulpa* bases, two of which were 5.0 in diameter and two that were 3.0 m in diameter.

Sillumocco–Huaquina (158) (Figs. 34, 48)

The site of Sillumocco–Huaquina (158) lends its name to the Middle and Upper Formative Pe-



FIG. 47. Fortification wall at site of Pukara Juli.

riod occupation in the Juli–Pomata region. It is not a type site in the traditional sense, but Sillumocco–Huaquina is indeed typical of the largest and most impressive Upper Formative and Tiwanaku Period sites in the region. Artifacts at the site reveal a series of occupations from at least the Middle Formative up to the Altiplano Period. Pasiri Period diagnostics and Late Archaic projectile points are found on the site as well.

Sillumocco–Huaquina is a classic type 3 site, characterized by a low hill with domestic terraces leading up to a semisubterranean, square structure on the hilltop. This “temple” area most likely dates to the Late Sillumocco and Tiwanaku periods. The subterranean construction is built with uncut fieldstones. It is very badly damaged, but we estimate it to measure approximately 9.0×9.0 m in size. Like the site of Palermo (212), there is a higher open area that corresponds to a *kalasasaya*-like enclosure. The site appears to have been intentionally reconstructed in a geometric shape, possibly in the form of a Tiwanaku double cross. Unfortunately, this remains conjectural because a large section of the site had been altered several years previously by the local landowner with a tractor. Sillumocco–Huaquina was excavated by

C. Chávez in the 1994 season. The analysis of these data has yet to be completed, but the preliminary results indicate a substantial Tiwanaku, Late Sillumocco, and Early Sillumocco occupation. Excavations on one of the highest terraces revealed a sequence of house floors similar to that discovered by Bermann at Lukurmata in Bolivia (Bermann, 1994). These excavations indicate a huge Tiwanaku level, characterized by a series of structure rebuildings, also similar to the area excavated by Bermann (1994) at Lukurmata.

Sillumocco–Huaquina is close to the site of Palermo (212). Like Palermo, it is an elite center but is considerably smaller in size (3.5 ha). This pattern is curious in that it appears that these two sites, along with Tumatumani and Altarani–Bebedero, constitute a cluster of elite/administrative/ceremonial sites surrounding the Moyopampa in the Middle Formative and Tiwanaku periods. Sillumocco is also important in that it is geographically associated with a series of relict raised fields, as are the other major sites in the Moyopampa area. This raised-field segment is watered by a canal that runs perpendicular to the canalized Rio Salado and then turns 90 degrees across the base of Sillumocco–Huaquina. The raised-field segment



FIG. 48. Tiwanaku projectile points from 158.

is excellent evidence for the construction of such agricultural systems during the main occupations of the site.

Takape (342)

This is one of the rare Early and Middle Formative sites without later occupations that was discovered in the intensive survey area. The site is located on a low ridge between two water-courses: the Rio Chachacomani and the Rio Takape. The site is found on the top and sides of the crest between these two rivers. It is characterized by a rounded, mound-like appearance that was produced by the collapse of the Middle Formative Period structures. The architecture of the site appears to have been tightly compact and agglutinated in plan, with a possible central court in the center of a number of domestic structures. This site, like site San Bartolomé–Wiscachani (022), is one of the best preserved (owing to the lack of

later occupations) Early and Middle Formative settlements in the survey.

Tiipata (118)

This Early Colonial cemetery site is located on a low hill. It contains the remains of at least two circular *chulpas* approximately 3.0 m in diameter. The *chulpas* are constructed out of fieldstones. There is one rectangular *chulpa* base or slab-cist tomb that measures 1.2 m on a side. There are also at least two cist tombs with mouths 0.6 m in diameter. Curiously, 20 m away is a large concentration of lithics. This modest site is important because the ceramic material is virtually pure Early Colonial, yet there are a variety of indigenous tomb styles represented: *chulpas*, slab-cists, and cists. Also, the rectangular slab-cist or *chulpa* is extremely rare in this area. Along with site 154, Tiipata is excellent evidence for the preservation



FIG. 49. Example of typical andesite agricultural implement.

of indigenous burial forms in the Early Colonial Period.

Tumatumani (001) (Fig. 32)

Tumatumani is one of the principal Early Sillumocco, Late Sillumocco, and Tiwanaku sites in the region. The site was excavated by the Lupaqa project in 1988 and was described in detail (Stanish & Steadman, 1994). This is one of the few type 1 sites in the survey region. It is composed of two mounds, one of which is U-shaped. The western mound, in contrast, is composed of two platforms, with terraces that were aboriginally about 1–2 m high. There were two principal architectural constructions on the western platform mound during the Late Sillumocco and Tiwanaku periods. During the Late Sillumocco Period, the occupants built the original two platforms; in the Tiwanaku Period, these platforms were rebuilt for the last time. An agricultural implement from this site, typical of the hoes of the region, is seen in Figure 49.

Tumuku (121)

The site of Tumuku is representative of the elite administrative and ceremonial centers of the region during Tiwanaku times (Figs. 50, 51). Rowe and Donahue (1975) mention a report by an Augustinian priest regarding the discovery of a stela (idol) from the Ilave–Juli area. The name of the hill where this stela was reportedly found is called Tucumu. According to Rowe and Donahue the priest reported that:

In the year 1619, Father Diego García Cuadrado . . . discovered a stone idol on the hill called Tucumu facing Lake Titicaca. The idol was three and a half varas high [at least 2.80 m] and had two faces, almost the way they depicted Janus, except that one face was that of a man and the other of a woman, with two snakes which climbed up it from the feet, and in the crown a large toad in the form of a headdress. They were worshipping it as god of food and kept it on a large slab.

(Rowe & Donahue, 1975, pp. 36–37)

The brief passage says that Father Diego was working among the “barbarous” people between “Hilavi” (Ilave) and Juli. Tumuku, of course, is near the major Inca and Early Colonial population



FIG. 50. Site of Tumuku from a distance.

center of the Juli region. It is a likely site for this stela to have been found, particularly in light of the fact that we discovered a sunken court that probably was home to at least one large stela such as the one described.

San Bartolomé–Wiscachani (022) (Figs. 52, 53)

This site was found on one of the high natural terraces located near the crest of the San Bartolomé hill. It overlooks the town of Juli and has a commanding view of the lake. The site is a series of terraces, at least three in number, that surround a small, flat area. In this flat area is a possible small sunken court. This possible court is defined by the presence of a small depression. Next to the depression is a petroglyph with a square design. The square design motif on the petroglyph may possibly represent the court itself. There are also four cut stone protuberances on the site, several of which line up with mountain peaks in the area. One sight line hits Tokohawa near Pomata, and another sight line hits one of the peaks in the Il-lampu chain.

San Bartolomé–Wiscachani is a very important site because it represents one of the few major sites with a Late Archaic, Pasiri, Early Sillumocco, and Late Sillumocco component without sub-

sequent Tiwanaku occupations. If the depression is indeed a sunken court, then it may represent one of the few examples in the area of a pre-Tiwanaku ceremonial construction that was not altered in the Tiwanaku Period. Most of the other sites in the area, such as Tumatumani (001), Palermo (212), and Sillumocco–Huaquina (210), have ceremonial constructions but also have Tiwanaku components. Therefore, San Bartolomé–Wiscachani may represent a very early corporate construction without any Tiwanaku Period reworking.

Unnamed Site (284)

This Tiwanaku, Altiplano, and Early Colonial Period site is located on a low hillside in the El Molino area. It is an odd site that is the only type 1 site not located near the lake edge. It is in the form of a small U and measures only about 15 m on its long axis. The projecting arms of the U are approximately 4.0 m long from the back of the mound. It is not a product of collapsed domestic structures but appears to have been intentionally constructed in this form. On top of the mounds is a series of intrusive tombs. There are twelve slab-cist tombs and at least two cist tombs. The slab-cists are approximately 0.80 m in diameter. This site is best interpreted as a Tiwanaku construction



FIG. 51. Site of Tumuku.

with a subsequent post-Tiwanaku reuse, either as a cemetery area or habitation. The mound built in this form is reminiscent of the east mound at Tumatumani (001) and is extremely rare in the study area. Unfortunately, the site is in danger of destruction from planned terrace building in the area.

Willahauci Calpa Capac (154)

This is a very interesting cemetery site located in the Moyopampa area. It runs roughly perpendicular to the lake edge on a natural terrace that rises about 20 m above the lake. On the ridge spur is a large accumulation of stones and rocks. Within this rock accumulation are the remains of at least one *chulpa*, four slab-cist tombs, and two cist tombs. The most surprising aspect of this site is that of the 22 sherds collected from the surface, 19 were Early Colonial and three were nondiagnostic. No other diagnostics from other occupational periods were found. Along with site 118, this site is excellent evidence for the preservation of indigenous burial practices in the Early Colonial Period.

Unnamed Site (155)

The unnamed site 155 is about 60 m from site 154. Like Willahauci Calpa Capac, 155 is found

on a low ridge or hill near the lake. It also has at least one circular *chulpa* 2.50 m in diameter and at least ten slab-cist tombs with internal diameters between 0.35 and 0.50 m. This cemetery is virtually identical in topographical location and tomb styles to site 154. Unlike site 154, however, we found a very different artifact collection that dates the site to the Expansive Inca and Altiplano periods. The data from sites 154 and 155 suggest that the use of above-ground tomb styles began in the Altiplano Period and continued into the Early Colonial Period. These sites provide some compelling evidence for the continuation of indigenous burial practices in the Early Colonial Period.

Yacari (282)

Yacari is located on the southern edge of the massif of the same name at 4200–4300 m.a.s.l. It has evidence of Pasiri, Early Sillumocco, and Late Horizon occupations. Inca use appears to have been restricted to a few structures and some *chulpas*, suggesting a ceremonial area. The Early Sillumocco and Pasiri occupation is lower and associated with the wet *bofedales* in the pampa below.

The Inca occupation is characterized by two structures with an associated 3-m-diameter circular *chulpa*. The structures are 3.0 × 4.0 and 2.5 × 4.0 m in size and were built with fieldstones.



FIG. 52. Site of San Bartolomé-Wiscachani (022).



FIG. 53. Site of San Bartolomé-Wiscachani with alignment (022).



FIG. 54. Site area of Huancani.



FIG. 55. *Chulpa* in the Huancani area.



FIG. 56. *Chulpa* in the Huancani area.

They are notably different from other abandoned structures in the region and are most likely pre-Colonial in date. The *chulpa* was built with fieldstones as well. Below the *chulpa* and the two structures are at least three domestic terraces with Pasiri and Early Sillumocco pottery. There is no standing architecture. Yacari represents one of the rare pre-Early Sillumocco occupations in the region. It is possible that the rock art from sites 499 and 500 is associated with Yacari.

Huancani Area

The Huancani area (Fig. 54) is a small pampa area with relict raised fields and a series of sites. One of the principal sites is 383, which has evidence of a substantial Formative and Tiwanaku occupation extending about 4.0 ha. Along the southern side of the Huancani pampa are a number of *chulpas* (Figs. 55, 56) that were first discussed by H. Tschopik (1951). These *chulpas* were built

in a Late Horizon style and are not associated with any definitive habitation area.

Zapacollo (019) (Fig. 12)

Zapacollo is popularly known as the “sleeping lion” hill. There are two crests on Zapacollo, each of which has a modern shrine or *capilla* on top. On the northernmost crest is site 019, a minor *pukara*. It has two or three low rings of walls encircling the hill in a typical fortification pattern. The site is a typical minor *pukara* that functioned as a temporary refuge site for the populations around the base of the hill. There are no structures visible on the surface at the present time, and the intensity of occupation was very low. The idea that the site functioned strictly as a ceremonial area remains a possibility. In particular, the Early Colonial sherds could be a result of ceremonial offerings, a practice that continues to the present day.

Results from the Reconnaissance Areas

The data from the reconnaissance areas are consistent with those from the intensive survey area. These data, of course, are skewed to the large and early sites, and we focused on areas that were likely to have Tiwanaku and earlier sites, as opposed to later ones. Nevertheless, there was nothing in the reconnaissance areas that contradicted the results from the intensively surveyed areas. The ceramic, tomb, and site typologies that we developed from the Juli area data were not altered by the reconnaissance area data. Furthermore, as with the intensively surveyed area, we found a number of large Tiwanaku and Formative sites and a number of smaller sites from all time periods. We did not find any large Inca sites, a fact that corroborates historical documents that list most major Inca sites in the Titicaca region.

One of the most significant finds in the reconnaissance areas was the discovery of the site of Ckackachipata. The site is a major Middle and Upper Formative Period site covering the huge peninsula that juts into the southern lake out of the Pomata or Chatuma pampa. Its area was about 5–7 ha during the Middle Formative Period and about 9 ha in the Late Formative. It was larger than any contemporary site in the entire study area during the Middle Formative Period; its size is on the same order of magnitude as Palermo. We interpret Ckackachipata to have been the seat of a major polity during the Middle and Upper Formative periods in the Pomata–Chatuma region.

This interpretation is supported by the ceramic data. We did not conduct an intensive analysis of the ceramic data, such as the one performed for the site of Tumatamani that defined the Early and Late Sillumocco assemblage (Stanish & Steadman, 1994). However, our less intensive analysis of the paste, surface treatment, and shape of the vessels indicates a style intermediate between Early Sillumocco and Chiripa. We found a higher percentage of Chiripa imports and a higher number of ceramic vessels that were imitations of Chiripa styles.

We hypothesize that the Ckackachipata polity

would be contemporary with Early and Late Sillumocco periods and would appear to have followed the same general cultural dynamics. This would include a smaller polity in the Early Ckackachipata Period, followed by the consolidation of a markedly ranked society in the Late Ckackachipata Period. The polity controlled large areas of raised fields, and there was an apparent site size hierarchy in the region during at least the Late Ckackachipata Period.

At least three other sites discovered in the reconnaissance areas could also have been the primary regional centers of polities in the Middle and Upper Formative periods, similar to Palermo and Ckackachipata. These are Kanamarca, Amazana China, and La Casilla; they are described below. Each of these sites is large, around 10 ha in the Late Formative and/or Tiwanaku periods, and each contains evidence of corporate architecture. Future work will be necessary to adequately characterize these polities.

The Ccapia reconnaissance area (Figs. 57–59) includes the edge of the lake around the large Ccapia Mountain that dominates the southern Titicaca Basin. The Desaguadero reconnaissance area was restricted to the Peruvian side of the river, from the town of Desaguadero to a distance several kilometers south. We discovered a number of important sites in both of these areas. The results from this reconnaissance are consistent with those from the intensive survey area. That is, we found a full range of sites and site types in the Ccapia and Desaguadero areas, just as we did in the Juli–Pomata area. Sites ranged in date from the Late Archaic to the Early Colonial Period.

The reconnaissance data indicate that the Upper Formative and Tiwanaku occupations in these regions were even more intensive than in the Juli–Pomata area. The site of Kanamarca, described below, has the largest cut stone blocks in the entire study area. We also found a number of stone stelae and cut stone blocks on a number of Upper Formative and Tiwanaku sites, including two un-



FIG. 57. Sites in the Ccapia reconnaissance area.

reported Upper Formative stelae with carvings at the site of Caninsaya.

The reconnaissance data support the association of Upper Formative and Tiwanaku sites with raised-field agriculture. In particular, the Chatuma area sites are adjacent to a huge raised-field area, and there is a high density of pre-Altiplano Period sites. Likewise, the Desaguadero river area encompasses a large number of raised-field areas and has a correspondingly high density of Upper Formative and Tiwanaku Period settlements. The data also corroborate the pattern of intensive use of the lakeside area, with a marked decrease in settlement away from the lake edge proper.

These data also corroborate the pattern of Altiplano Period fortified sites with associated undefended hamlets. The *pukaras* of Calvario Pata,

Huichajaja, Llaquepa, Pukara Chatuma, and Tanka Tanka all have associated smaller hamlets.

Major Sites in the Ccapia Reconnaissance Area

Accari

This site is located near the town of Imicate, several kilometers from the lake at the base of the large Cerro Ccapia. The site is located in the colluvial fans of a small hill called Vincalla Vinco, on a low, sloping surface. There is a small Middle and Upper Formative (approximately 0.25 ha) occupation, with a larger (approximately 0.50 ha)

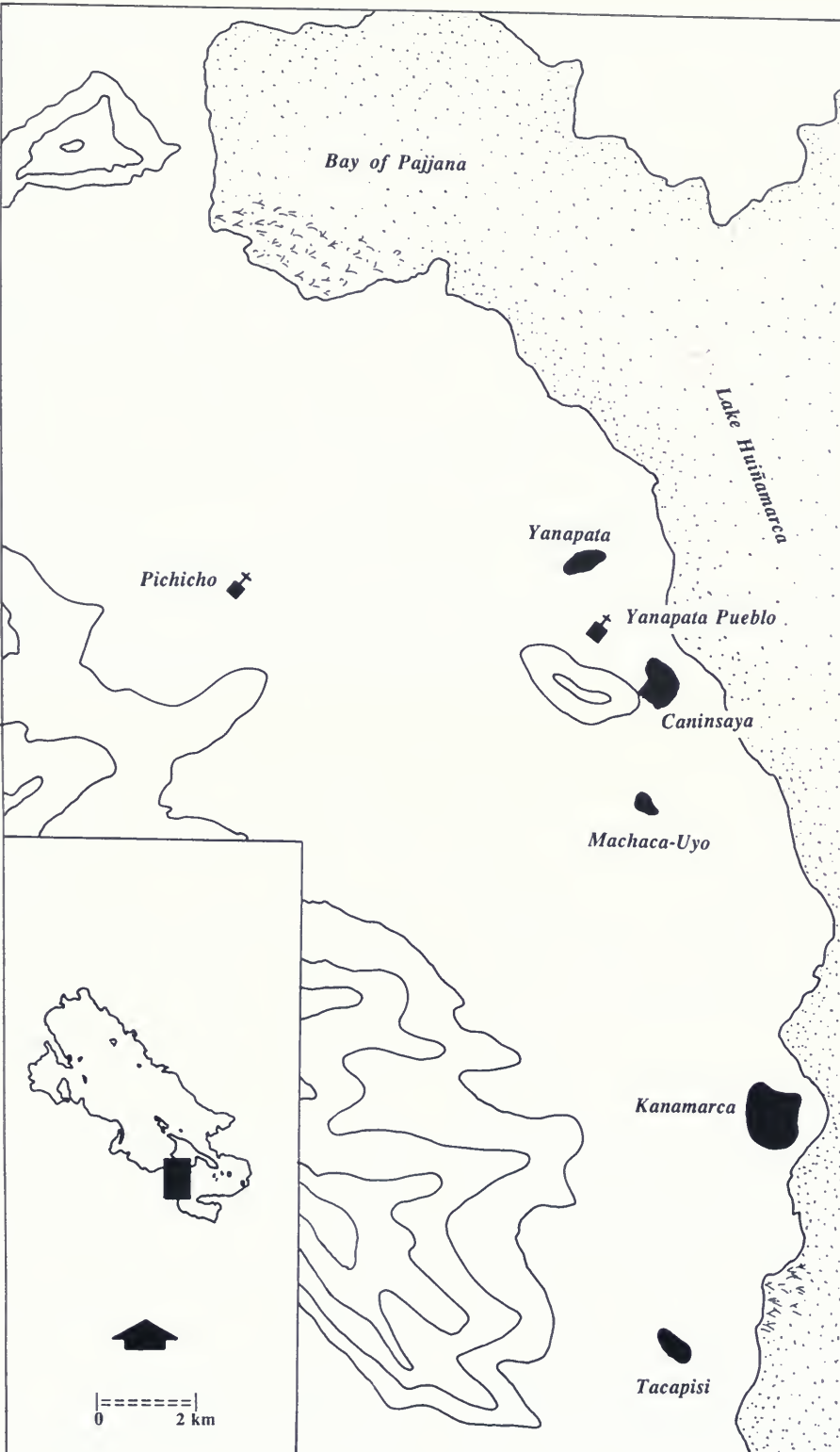


FIG. 58. Ccapia area—Yunguyu—Zepita area.

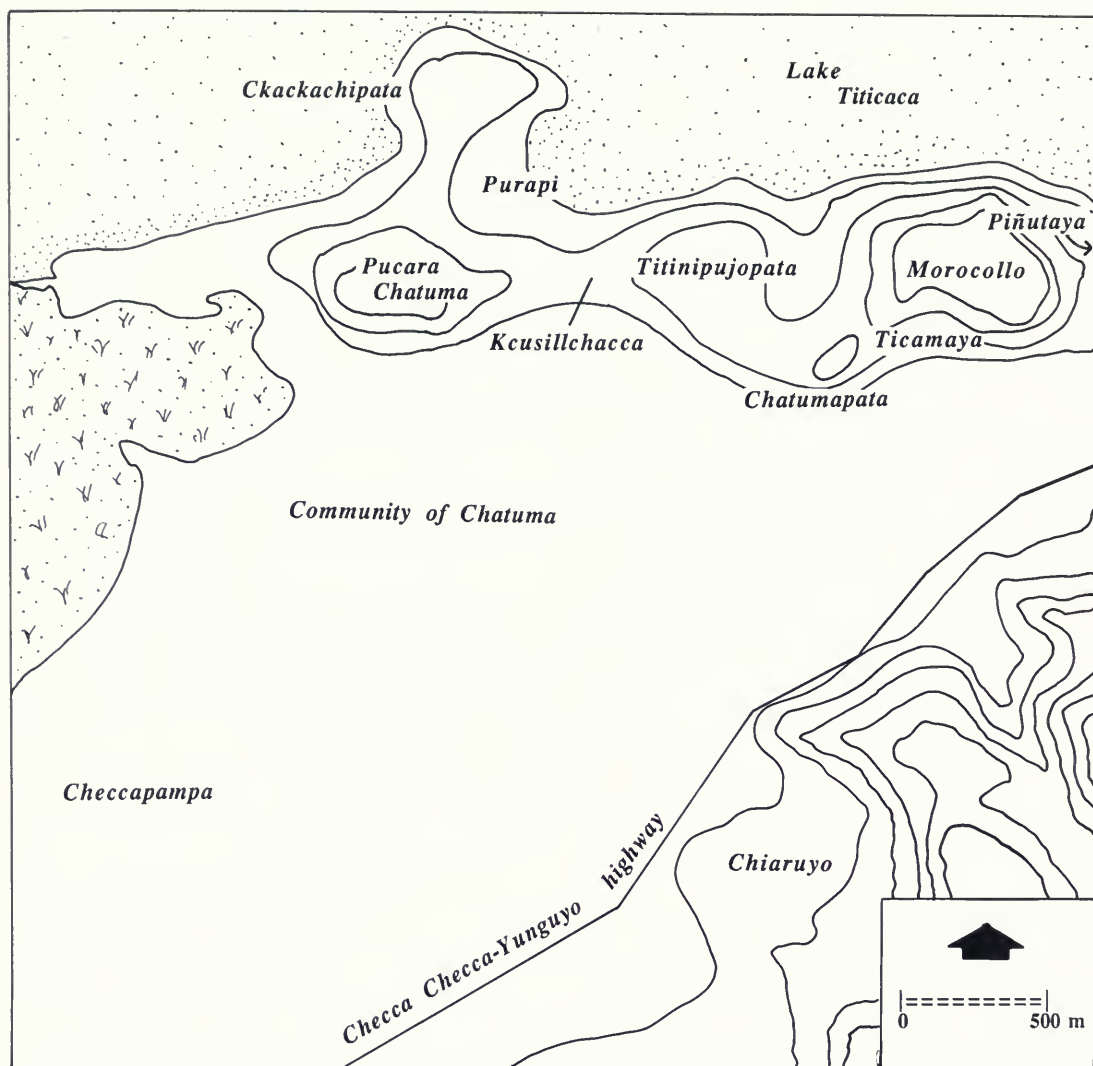


FIG. 59. Chatuma area sites.

Late Horizon occupation. This small site is important because it demonstrates early occupations away from the lake edge in good agricultural areas. It is a small hamlet that is undoubtedly representative of many other such sites in the region.

Acero Phatjata (Fig. 60)

The name of this site means “cut snake” in Aymara and refers to the geological formation on which this site is located. Beginning at the mountain and *pukara* of Huichajaja, a huge, uplifted

rock extends in a sinuous pattern down to the lake. At the end of this rock formation, near the lake, the topography rises slightly to form a low natural hill. The rise at the lake edge gives the impression of a snake’s head, cut off from its body, the latter represented by the formation up to Huichajaja. The site is located to the northwest (or lake side) of the Checca Checca-Yunguyo highway between kilometers 15 and 16.

The natural rise near the lake makes a perfect location for a typical type 3 domestic terraced low hill typical of the Formative and Tiwanaku Period sites in the region. The habitation area begins near



FIG. 60. Site of Acero Phatjata.

the modern highway, extends up to the top and around the sides, and continues on toward the beach area. The total size of the Acero Phatjata site is about 4.0–6.0 ha. The top of the site is heavily eroded, and bare rock is exposed throughout the surface. There is also considerable disturbance on the south and east sides of the site from modern construction. As a result, there is no evidence of corporate architecture.

Heavy concentrations of pottery were found on the terraces immediately below the hilltop, a result of both erosion and intensive domestic use of the terraces. The major occupations of the site include Middle Formative, Upper Formative, Tiwanaku, and Late Horizon. A number of modern houses on the side of the site near the road have destroyed several domestic terraces.

Amaizama China

This site was a large and important center during the Upper Formative and Tiwanaku periods. There is also a significant Late Horizon occupation on this site, and there are minor concentra-

tions of Middle Formative and Altiplano Period pottery. Amaizama China is located slightly more than 1 km south of the school at Isani. It is about 500 m from the lake. Habitation refuse was found near the road and on up the hill to its crest, where the habitation area is concentrated. A *quebrada* separates the site, and there are habitation remains on both sides. The total habitation and ceremonial area of the site is at least 6 ha, and it could be as large as 10 ha.

The site sits on a narrow hill or ridge that runs almost perpendicular to the lake. There are at least three or four very wide domestic terraces on the lake side, and there is an extensive area of generally flat habitation area on the crest. Large, cut stone andesite blocks on the top of the hill indicate that there had been a corporate construction of some sort, most likely a sunken court and/or formally faced stone terraces. The remains of a possible platform can be detected at the top of the hill, but the site is very badly disturbed. Sr. Agustín Mamani Mamani, a local landowner, informed us that many of the blocks were carted away years ago to build modern structures in the town of Isani.



FIG. 61. Site of Caninsaya with two stelae.

Calvario Pata

This *pukara* is located west of the Puno–Desaguadero highway between kilometers 126 and 129. The site has at least three large walls surrounding the high hill. It was not ground checked but appears to be typical of the *pukaras* (type 5 site) found only in the Altiplano Period. Because we did not survey the site, we were unable to determine whether there were permanent habitations in or near the fortification walls. We were therefore unable to confirm whether it was a major or minor *pukara*.

Camuna

This modest type 3 site is located on a low hill at kilometer 8.5 on the Checca Checca–Yunguyu highway. The site is about 100 m directly south-east of the highway. Camuna is characterized by a series of low domestic terraces that surround a low hill in a pattern typical for type 3 sites. There is, however, no indication of corporate architecture at the site. The area is heavily worked as agricultural land, and the surface of the site is badly disturbed.

The habitation area of Camuna covers about 1.5–2.0 ha. The major occupations of the site include Middle Formative, Upper Formative, and Late Horizon. We found no Tiwanaku sherds on the surface. As with many sites of this type in the region, Camuna was most likely occupied in the Middle Formative, architecturally enhanced in the Upper Formative, and then subsequently abandoned, either after the Tiwanaku or Altiplano Period. The site was later reoccupied by Late Horizon populations as a small village or hamlet.

Caninsaya (Figs. 61–63)

The site of Caninsaya is located almost 6.0 km south of the crossroad where the Zepita–Yunguyu road meets the Yunguyu–Yanapata road. This is a large type 3 and type 1 site located near the town of Yanapata on the low, flat, wide lake plain. There are two distinct architectural components on the site: a major domestic hillside area west of the road that covers about 2.0–4.0 ha and a second mounded area east of the road that covers about 2.0–3.0 ha. In total, the habitation and ceremonial area of the site is between 4.0 and 7.0 ha. Diagnostic artifacts on the site include Middle



FIG. 62. Yaya-Mama stelae at site of Caninsaya.



FIG. 63. Yaya-Mama stelae at site of Caninsaya.

Formative, Upper Formative, Tiwanaku, and Late Horizon.

Caninsaya has two cut stone stelae that fit into the Yaya-Mama tradition as defined by Chávez and Chávez (1975) (Figs. 62, 63). The motifs include a Late and/or Middle Chiripa style face, llamas, some geometric patterns, and possible snake designs. The stelae are very significant in that they indicate an elite center at this site, most likely contemporary with Yanapata, Kanamarca, and other similar sites on this side of the study area. The stelae are currently protected by the community, a fact that most certainly explains their existence on the site. It is likely that many other similar sites had stelae such as these that have since been destroyed or moved.

Ckackachipata (Figs. 64, 65)

Ckackachipata represents the largest Middle Formative site discovered in the entire survey and reconnaissance area from Santiago Chambilla to Desaguadero. Virtually the entire peninsula that juts into the lake is covered with domestic terraces and artifactual debris, the vast majority of which are Middle Formative in date. There are moderate

scatters of Upper Formative, possibly a very light Tiwanaku occupation, and light scatters of Late Horizon pottery as well. The total site area covers at least 9 ha, of which we estimate about 5–7 ha was occupied during the Middle Formative. This would make the Middle Formative occupation at Ckackachipata larger than that at Palermo (212) in the Juli area. There is no evidence of corporate architecture on the site. However, the wide terraces, leading up to a flat area with heavy concentrations of artifacts, are suggestive of corporate constructions such as those found at Palermo and other type 3 sites. The suggestive evidence includes sunken courts, artificially flattened enclosure areas, and the like. Ckackachipata is the largest Middle Formative site in the entire study area. To appreciate its importance, it is significant that it is substantially larger than the site of Chiripa or any previously known Middle Formative site outside of the Tiwanaku or Pucara areas.

Ckackachi Mancja

At the far northern side of the Ckackachi peninsula, along the beach, is a scatter of Late Horizon pottery that covers 0.5–1.0 ha. The site is



FIG. 64. Site of Ckackachipata.



FIG. 65. Site of Ckackachipata.

possibly associated with some cut stone blocks further west on the beach that are known locally as “Sillas del Inca.” The site represents a modest Inca period occupation along the lake edge, possibly a specialized fishing settlement.

Imicate

The site of Imicate was first reported by John Hyslop in his dissertation (1976). He described the site as being “located on a knoll about 2 kilometers from the lake” (Hyslop, 1976, p. 384). He also noted the existence of stone blocks on the surface that “were probably in the Tiwanaku style. One may be an eroded statue” (Hyslop, 1976, p. 374). The site is approximately 1.5 km from kilometer 18.1 on the Checca Checca–Yunguyu highway. On the road that leads toward the community of Imicate from the main road is a standing rock, probably a cut stone from now-destroyed corporate architecture at Imicate. This stone is most likely that referred to by Hyslop. Northwest of this rock is the mound, with a modern church and/or community center on top.

This major type 1 mound is at least 3 m above the natural ground surface. The site is at least 5.0 ha in size, and possibly larger. The substantial initial Middle Formative Period occupation was followed by Upper Formative, Tiwanaku, Altiplano, and Inca occupations. The Tiwanaku and Inca pottery on the site is of exceptional quality, attesting to the importance of this site. In fact, we recovered one of the few fragments of nonlocal Inca Period pottery at this site.

The Imicate site is being systematically destroyed by the community to quarry for building stone. They are cutting into the mound on the east end, collecting small rocks that appear to have been used aboriginally as fill for a large platform construction. The site is very similar to Tumatumani (001), near Juli. It was an elite center, with evidence of substantial corporate architecture and access to fine ceramic vessels from around the region and beyond.

Isla Quiljata

Isla Quiljata is a very prominent island located near the lake shore in the Chatuma area. The island itself rises dramatically out of the lake, with very steep sides. It is an island today, but the lake levels around it are very shallow. In antiquity, and

in the recent past, the island was almost certainly continuous with the mainland during periods of drought.

We surveyed the top of the island and found only a small Altiplano Period occupation. There were a few Pucarani-like sherds as well as some round or oval structures. The top of the island supported only a modest occupation during the Altiplano Period. A few Late Horizon sherds suggest either a very small habitation site or perhaps a burial and/or ceremonial area on the summit.

At the southeast side of the island, on the beach area, is a large Inca site that measures between 2.0 and 3.0 ha in size. There are a number of slab-cist and *chulpa* tombs associated with this habitation area. The Inca site is larger than most contemporary hamlets and is thus classified as a small village. There is no evidence of corporate architecture, and the site is not listed as a major settlement in any documents of the period. One possible explanation for the site location is the abundant *tatora* reed stands in the lake near the island today. The site could have been a specialized *tatora*-producing and fishing settlement within the Inca settlement system.

Kanamarca (Figs. 66, 67)

Kanamarca is located on a very wide, low hill north of the Zepita–Yunguyu road near the village of Calacota. The school of Kanamarca is located on the northern end of the site. The Rio Calacota runs directly to the east of the site. Kanamarca is easily noticed because it rests on one of the most prominent natural hills that juts into the lake. The site contains Middle Formative, Upper Formative, Tiwanaku, and Late Horizon Period diagnostics on the surface. Its habitation area covers from 7 to 10 ha. The hill is heavily plowed, and there is only a trace of some very wide, large, and low domestic terraces. Very large cut stone andesite blocks are found on the surface, indicating the existence of a large corporate structure or structures. These are the largest cut blocks that we have found to date in the study area, and they suggest a corporate construction of considerable importance.

The site is also located next to a probable raised-field area, one of the few such areas on this side of the lake. We were unable to examine the pampa to determine if there were any obvious relict raised fields. However, the area is low, swampy, and has topographical features similar to



FIG. 66. Site of Kanamarca with massive cut stone blocks.



FIG. 67. Site of Kanamarca with massive cut stone blocks.

those of raised-field areas in the region. Most notably, there is a large circular depression in the pampa, similar to the reservoir discovered by Kolata and Ortloff at the major Tiwanaku site of Pajchiri in Bolivia (Ortloff & Kolata, 1989). Kanamarca could very well represent another Middle and Upper Formative elite center, similar to Palermo and Ckackachipata. We did not have sufficient time to study the area of the site in detail because the local community requested that we spend no more than a half hour on the site. Out of respect for their wishes, we made no collections outside of the immediate hill area, but we were permitted to spend the 30 minutes examining (but leaving) diagnostics on the surface. If the Middle and Upper Formative occupations were as large as we believe, the site could have been the center of a chiefly lineage during these periods, comparable to Ckackachipata and Palermo, and the head of a major autonomous polity prior to Tiwanaku expansion. This very important site deserves considerably more research.

Kasani

Kasani is the border town between Peru and Bolivia on the road from Yunguyu to Copacabana. Exactly on the border at the arch north of the church is a type 3 site with at least Middle Formative, Upper Formative, and possibly Tiwanaku pottery on the surface. The site is literally shared between the two countries. Being a border area, the site is heavily damaged. However, its surface features suggest a typical type 3 site, with domestic terraces and probable corporate constructions. This may also be the source of the Kasani stela described and figured by Chávez and Chávez (1975, fig. 13).

Llaquepa Mancja

Below the fortified *pukara* of Llaquepa, on the north and northwest sides, is the large Middle Formative, Upper Formative, Tiwanaku, and possibly Late Horizon habitation site of Llaquepa Mancja. This classic type 4 domestic terrace site covers an area of at least 3.5 ha. The habitation area begins at least at the modern cemetery area on the northwest side of Cerro Llaquepa and continues east along the base of the hill for about 300 m or more. There are at least four major domestic terraces, and a number of smaller ones, that were

constructed along the base of the hill down into the pampa area. These terraces are large, about 30 m in width, and they continue up the hill for at least 100 m.

Collections from the site indicate that there were substantial Middle Formative, Upper Formative, and Tiwanaku occupations. Finely made local Inca fragments were found in restricted areas on the upper habitation terraces, possibly associated with the remains of some round, fieldstone *chulpas*. Small quantities of Altiplano Period pottery were also recovered from the site. The site is located near the major raised fields in the Pomata pampa and is part of this major settlement complex in this region.

Machaca-Uyo

This modest 0.5-ha site is composed of a small mound with Middle Formative, Upper Formative, and Late Horizon diagnostics. The site has a few nice fieldstone *chulpas*, and there is a moderate density of artifacts spread over it. It is important in the Ccapia reconnaissance area because it demonstrates the existence of small sites of this type similar to those in the Juli–Pomata intensive survey area. That these small sites exist indicates a substantial range in site sizes, suggestive of the same site size hierarchies seen in the survey zone.

Misavi Pampa

We surveyed a section of the beach about 100–200 m from the lake, between Queñuani (Fortina Vinto) and Camuna. This area exhibits a settlement pattern distinct from any in the Juli–Pomata intensive survey area. The entire area surveyed, approximately 3 km, has at least a light concentration of pottery, with occasional heavier concentrations of artifacts in restricted areas. In other words, the entire beach constitutes a habitation area, with some concentrations of now-destroyed structures. Prehispanic diagnostics included sherds from the Middle Formative up to the Late Horizon. These survey data indicate that the Misavi Pampa was one of the most heavily occupied areas in the entire study area, from the Ilave Pampa to the Desaguadero River.

Piñutaya (Fig. 68)

This site is located on the east side of the Morocollo hill on a low ridge that is oriented 320°/140°.



FIG. 68. Site of Piñutaya.

The site begins about 100 m from the road at kilometer 8 on the Checca Checca–Yunguyu highway. It rests on a narrow ridge about 50–75 m wide and a low flat area below the larger Morocollo hill. The site is composed of three or four low domestic terraces on each side of the ridge that are built around a small flat area at a low ridge spur. The total domestic area is approximately 2.0–3.0 ha in size. There is no evidence of corporate architecture in the flat area.

A number of below-ground tombs were located at the top of the hill. They have all been looted. We found a number of Middle Formative sherds near the looters' piles next to these tombs. The tombs are therefore most likely representative of a Middle Formative cemetery placed atop the domestic area of this site.

The site is largely Middle Formative in date, with a light scatter of Upper Formative and Inca pottery. We also found some Altiplano Period sherds on the west side of the site on some lower terraces. This rather large Middle Formative site is associated with the huge Ckackachipata peninsula settlement about 2.0 km to the west. Piñutaya is one of several major Middle Formative sites in the Chatuma area.

Poconcirca

This is a small Late Horizon site located on the flat beach area near the school in Isani. There are several small type 2 mounds with additional scatters of Late Horizon pottery that cover an area of a little more than 1 ha. Although we did not intensively survey this area, informal walkovers suggest that Poconcirca is most likely representative of a number of sites in the region near the lake during the Inca Period.

Pucara Chatuma (Figs. 69–71)

This is a major *pukara*, containing abundant domestic terraces and heavy artifact concentrations. Most of the primary defensive walls have been destroyed, but sufficient sections remain to indicate a site with at least three large perimeter walls. The top of the hill is characterized by a fairly flat crest with abundant Altiplano Period pottery, a well-made stone carving or petroglyph with concentric rings, and several cut stone blocks (Figs. 70, 71). There appear to have been a large number of domestic terraces outside of the defen-



FIG. 69. Site of Pucara Chatuma.



FIG. 70. Cut stone on Pucara Chatuma.



FIG. 71. Cut stone on Pucara Chatuma.

sive walls along at least the southern and western sides of the hill, containing remains from the Middle Formative through the Early Colonial periods. The only occupation of the top of the site as a habitation area was during the Altiplano Period. Combined with the residential areas near and on the top of the hill, the total habitation size for Pukara Chatuma during the Altiplano Period is at least 4.0 ha, and possibly much larger.

There is a large *chulpa* at the top of the site, built in Inca style. The *chulpa* is square, about 5 m on a side. Around the *chulpa* and dispersed at the top of the site in general are a number of very well-made Inca sherds. These most likely represent the remains of destroyed *chulpa* offerings in the burials and are not an indicator of a residential occupation.

On the east side of Pucara Chatuma, along its base near the pampa, is a set of about three to five domestic terraces with moderate to light concentrations of pottery. The pottery collected here is predominantly Middle Formative, Upper Formative, Tiwanaku, and Altiplano. The Altiplano Period occupation is almost certainly associated with the *pukara*. It is not a large site—about 0.5 ha in size—but it is one of a number of sites associated

with the complex settlement system in the Chatuma area.

On the south side of the *pukara* is a section called Kcusill-Chacca. This habitation area begins near the raised-field areas and extends up to the saddle separating the Pukara Chatuma from Cerro Morocollo. The Kcusill-Chacca area contains about 1.0–2.0 ha of domestic residences, built as domestic terraces. This section has Tiwanaku, Altiplano, and Late Horizon Period pottery.

Pusicuchuni

This is a small (less than 1 ha) Late Horizon site west of the road just north of the Rio Pusicuchuni. Sites such as this are very common in the Juli–Pomata intensive survey area, and we can confirm the existence of similar hamlets in this area as well. Like the site of Poconcirca, Pusicuchuni is probably typical of hundreds of Inca Period sites in this area.



FIG. 72. Site of Queñuani (Fortina Vinto).

Queñuani (Fortina Vinto) (Figs. 72–74)

This site was first discovered by Hyslop during his dissertation (1976) research. He named it Qeñuani, after a village not far from the site. The official topographical maps refer to this specific area as Fortina Vinto. Hyslop described the site as “resting on a small promontory into Lake Titicaca” (1976, p. 248). He furthermore described it as “covered with terraces 5 to 10 m. broad, some of which appear to be platforms, particularly in the highest part where they descend to the north and to the south” (Hyslop, 1976, p. 248).

The site indeed sits on a long, relatively narrow ridge that trends north–south into the lake. As Hyslop (1976) noted, a series of low, wide terraces climb from almost the road north to the top of the low hill. Other terraces are found around all sides of the site, although the habitation area does not extend to the lake. Near the top of the site is a rectangular structure approximately 20×25 m in size. It appears to be an aboriginal corporate structure in the form of an elevated and walled platform or plaza. Near this structure is a cut stone. There is no evidence today of other corporate architecture inside of this structure. Excava-

tions are clearly warranted at this site. Curiously, there is a small, squarish mound near the lake, below the summit of the main area of the site, that could be a type 1 site. There was very little debris on this mound, so we could not phase it.

The major occupations of the site include Middle Formative, Upper Formative, and Tiwanaku, with some minor scatters of Altiplano and Late Horizon Period artifacts. We found one Tiwanaku incensario and a very atypical strap handle with a face (Fig. 74). The total habitation area of the site is approximately 4.0–6.0 ha.¹⁹

Tacapisi (Fig. 75)

This important site is located a little more than 1 km from Copani, on a high ridge about 200 m from the road. The ridge is located between two small *quebradas*, or rivers. Occupation at the top of the hill is Late Archaic, Early Formative, and Middle Formative in date. Below the ridge and

¹⁹ Hyslop (1976) reported the site as being 50 ha in size. This is most likely a typographical error. The total habitation area of Queñuani is about 5 ha.



FIG. 73. Upper Formative ceramic diagnostics from Queñuani.



FIG. 74. Probable Upper Formative Period ceramic strap handle—Queñuani.



FIG. 75. Site of Tacapisi.

terraces is an Upper Formative and Inca occupation.

The habitation area is about 1.0–2.0 ha in size. Beginning near the road is a series of about four to six terraces that rise up to the top of the ridge. At the top of the hill there is a low, flat area that may have contained corporate architecture. This area is badly disturbed, however. The artifacts on the upper terraces and the ridgetop are overwhelmingly Middle Formative in date, whereas the lower terraces contain Upper Formative and Late Horizon artifacts. We also found one Late Archaic diagnostic point and several Early Formative pottery fragments. This pattern of a small Early and Middle Formative occupation, associated with some Late Archaic diagnostics, is found at several other major sites in the survey area, including San Bartolomé–Wiscachani (022), Silumocco–Huaquina (158), site 082 near the Yacari hill, and Palermo (212). These sites represent the earliest settled hamlets or villages in the southwestern Titicaca Basin, marked by the beginning of pottery production and intensification of horticultural and fishing economies.

There are hills and ridges to the north and south

of Tacapisi that were not surveyed. These areas most likely contain additional sites.

Tintinpujopata–Ticamaya–Chatumapata–Morocollo²⁰

This settlement complex is located in the Chātuma area south of Pukara Chatuma and Ckackachipata. It is a series of small scatters and *chulpa* tombs, dating largely to the Altiplano and Late Horizon periods. On Tintinpujopata, there is some earlier Tiwanaku and Upper Formative pottery on the basal terraces near the pampa. Chatumapata currently has a modern *mirador* on the top. To the north of the site is a scatter of Altiplano and Late Horizon diagnostics on some domestic terraces. The southwestern side of Morocollo also has some contemporary domestic terraces. On the saddle of the hill between Chatumapata and Morocollo is the area called Ticamaya. Ticamaya has two fine *chulpa* tombs built in fieldstone, pre-Inca

²⁰ Not to be confused with the site of Tintinpujo, near the Rio Desaguadero.



FIG. 76. Site of Yanapata with stela.

masonry. One *chulpa* has two distinct floors. The second *chulpa* is badly destroyed, the blocks being removed several years ago for construction in Pomata. An informant stated that it was originally dressed with fine stone blocks and was square.

Tiracachi

This site is located between Yunguyu and Kasani, about 350 m from the road and about 500 m due north of a modern cemetery. The site is located near probable raised-field areas on the lake edge below. This settlement complex consists of a series of low hills with varying densities of prehistoric remains. A modest 1.0-ha Middle and Upper Formative site is located on the low part toward the lake. There is a moderate to high density of pottery on this section of the site. There is no evident corporate architecture on the site.

Higher up, on the low hills to the east, there is a 1.0- to 1.5-ha Late Horizon site with some fairly fine pottery. No architecture exists on this section of the site, but modern agricultural walls, possibly made with prehistoric stones, and a decent road that could possibly be prehispanic are found on Tiracachi.

Yanapata (Fig. 76)

Yanapata was first reported by Hyslop in his dissertation (1976, pp. 255–257). The site is located about 1 km from the crossroad where the Yanapata road branches off from the Yunguyu–Zepita highway.²¹ It is 0.5 km from the plaza in Yanapata proper. Hyslop described Yanapata as located on “a hill pointing northward toward Lake Titicaca which is less than 1 km. away” (1976, p. 255). He furthermore noted the existence of two badly eroded monoliths on the surface, one of which was recently placed upright by the local landowners. The upright stela is about 3 m in height, squarish, and approximately 20 × 40 cm on a side. Hyslop (1976) felt that the remains of a human figure could possibly be seen on the upright stela. He also noted the presence of building stones and other cut stone blocks typical of Tiwanaku and Upper Formative sites in the region.

²¹ Since John Hyslop and Elias Mujica visited the area, in the early 1970s, the roads have been improved and their courses slightly altered. Some crossroads, for instance, have been changed. Therefore, Hyslop’s directions in his dissertation (1976) could differ from ours when referring to the Zepita–Yunguyu or Yanapata–Yunguyu roads and landmarks associated with the roads.

Our observations of the site are generally consistent with those of Hyslop (1976). The habitation area of Yanapata is at least 3 ha (Hyslop estimated the site area at 5 ha). In our typology, Yanapata is a type 1 mounded site, with a probable aboriginal corporate construction on top of the hill where the stelae are now found. Upper Formative and Tiwanaku pottery dominated the diagnostic artifact assemblage, with small amounts of Inca and Middle Formative. The site was a major elite/ceremonial center in the Middle Formative and Tiwanaku periods.

Major Sites in the Desaguadero Reconnaissance Area (Figs. 77–79)

Callanga

This site was discovered and analyzed by Hyslop (1976, p. 290). We did not visit the site, and rely exclusively on Hyslop's description. He described the site as two low mounds about 1 m high, with subterranean cist graves in the area. He also suggested that it may include a platform and rectangular structure of unknown age (Hyslop, 1976, p. 290). Hyslop recovered Altiplano and Tiwanaku Period diagnostics from the site.

The site appears to be associated with the burial area, found by Hyslop (1976), to the west. There also seems to be a small Tiwanaku and post-Tiwanaku settlement near the Desaguadero River, probably associated with some raised fields in the area.

La Casilla (Figs. 80, 81)

La Casilla is located at the crest of the road that separates the Desaguadero pampa area from the Challaquenta area. The site represents one of the most important Upper Formative and Tiwanaku Period settlements in the Desaguadero region. There was also a smaller but significant Late Horizon occupation of the site. The habitation area of the site covered at least 4.0 ha during the Upper Formative and Tiwanaku periods, and it was probably larger. A series of at least six very large and wide domestic terraces climb up the southern side of Cerro Chojllapata. There is evidence of domestic architecture on the site, including rectangular and circular buildings, stone blocks, and canals. The canals are not agricultural; they appear

to be similar to those found at Lukurmata, in Bolivia, which functioned as domestic sewers or water sources inside the habitation area.

La Casilla is a rare type 4 site, with evidence of corporate architecture. Figure 81 is a photograph of a large cut stone block, possibly from a sunken court typical of the Upper Formative and Tiwanaku sites in the southern Titicaca region. The block has no carving on at least three sides and is very well worked and rectangular. We could not turn it over, so we were unable to see the fourth side. This is typical of the building stone used in sunken court constructions, such as those found at Palermo (212), Sillumocco–Huaquina (158), and Incatunhuiri (Kidder, 1943, p. 10), and not typical of stelae.

An important aspect of this site is that there is abundant raw copper ore on the surface. The residents of the site were therefore almost certainly exploiting the source of copper near the site of Chincane, less than 1 km away (see below). The location of the settlement at this site could therefore represent a compromise between access to the raised-field area near the river, access to the copper source, and a suitable location for habitation on the hillside.

Chincane

This site is located along the eastern side of Cerro Chujllapata, immediately above the modern road. Chincane has a low density of Middle Formative, Altiplano, and Late Horizon Period diagnostics on the surface. The site is composed of two or three small domestic terraces. There is no existing architecture on the site.

The site area itself is small, less than 1 ha. The significant feature of the site is its proximity to a raw copper source found in a small *quebrada* adjacent to the habitation area. The *quebrada* runs through the flanks of the Cerro Chujllapata and exposes a relatively high-grade copper source, judging by the bright green color of the deposits. This is the only copper source discovered in the study area. The Chincane copper deposits are almost certainly the source of the surface copper found on La Casilla, and it is most likely that this site, combined with La Casilla, was the residence of workers who exploited the ore during the prehispanic periods.

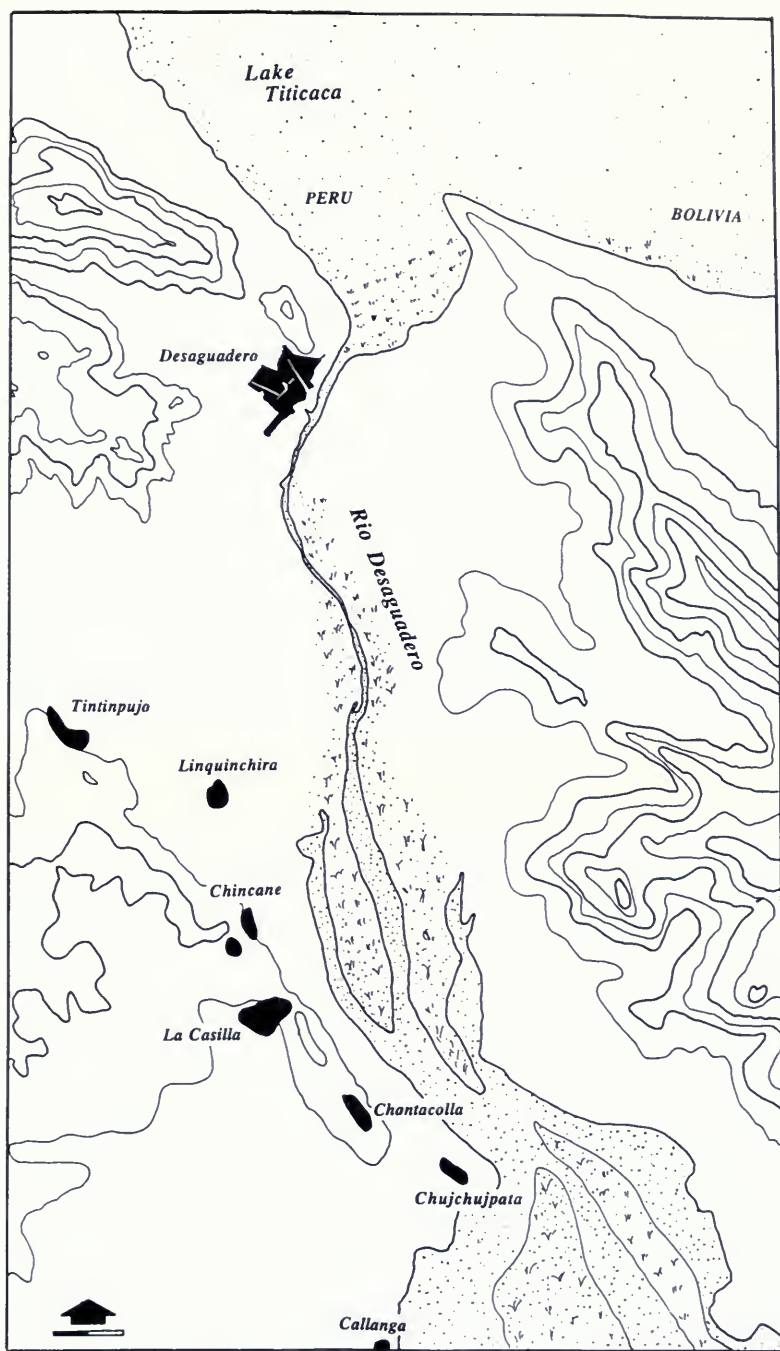


FIG. 77. Sites in the Desaguadero reconnaissance region.

Chontacollo

This major Altiplano, Late Horizon, and Early Colonial Period site is located on the side of a hill

named Huaripucho. The site itself faces the modern road and is on the opposite site of the hill from the Rio Desaguadero. It is a typical type 4 site, composed of a series of moderately sized do-



FIG. 78. Desaguadero River area.

mestic terraces. The habitation area is minimally about 3.0 ha in size. Surface debris concentrations range from moderate to heavy, including Kelluyo ceramics (Fig. 82). The site is typical of numerous post-Tiwanaku residential sites in the study area. The fact that the site is unfortified, and not near any major or minor *pukaras*, is very significant.

Chujchujpata

This Middle Formative through Early Colonial Period site is located near the river along a low crest that runs about 120°/300° in direction. The site has a moderate to high density of artifacts on the surface. It is a series of small domestic terraces that were built along the southeastern side of the crest. There are also two low artificial mounds on the flatter area of the site located toward the river. These are not typical type 1 mounds because they are too small and do not appear to have been intentionally constructed. Rather, they are more like the type 2 mounds that are almost always found in the pampa areas. Such mounds outside of pampa areas are rare in the study area, and their function and nature are un-

known. It is possible that they are nothing more than collapsed habitation structures, identical to type 2 pampa mounds, that have survived because the area is not intensively cultivated. It is also possible that they were specially constructed structures not yet previously discovered in the survey or reconnaissance area. Finally, it is possible that these mounds are Colonial or early Republican in date and not in fact associated with the prehispanic occupation. Excavations are necessary to define this site with greater precision. The habitation area is at least 1.5 ha in size. The principal occupations are Upper Formative, Late Horizon, and Early Colonial, with a minor Middle Formative occupation. There is a possible Altiplano Period occupation as well. The site is associated with the raised-field agricultural area near the Desaguadero River.

Kelluyo Area

The Kelluyo area is located on the extreme southern edge of the study area. A brief survey was performed in this area to assess the nature of the archaeological settlements and to test the



FIG. 79. Desaguadero River area.



FIG. 80. Site of La Casilla.



FIG. 81. Cut stone at site of La Casilla.

proposition that the region south of Tanka Tanka constituted a distinct cultural area in the Altiplano Period.

We discovered a series of *chulpas* and two Altiplano Period settlements directly above the town of Kelluyo.²² These *chulpas* and associated habitation sites are found along the base of the Jachacirca mountain range, a geological formation that runs more or less north-south. Below the top of the range is a series of colluvial fans cut by *quebradas*. The sites and *chulpas* are located on these fans.

The *chulpas* were in a line slightly west of north (350°/170°), separated by considerable distances of 50–100 m. The *chulpas* were all pre-Inca in date, made with uncut fieldstones typical of the Altiplano Period. At least one of them had a deep (at least 1 m) subterranean cist covered by the high *chulpa* superstructure. This *chulpa* is similar to the type 3 *chulpa* of Tschopik, noted principally from the site of Viscachani, near Chucuito (Tschopik, 1946, p. 15). Informants told us

that there used to be many more such tombs, but they have since been destroyed.

We discovered two major habitation sites in the Kelluyo area. One was a small site, about 0.5 ha in size. This site was located on the hill called Waraque. It contained Altiplano and Late Horizon Period diagnostic pottery. A second site was considerably larger and located on the hill called Yocucholoma. Yocucholoma is at least 1.5 ha in size, and possibly larger. The site has a moderate density of pottery on the surface, all of which is Altiplano and Late Horizon in date. Altiplano pottery dominates the surface collections. The site is relatively flat, with some very low and broad terraces on all sides. Above-ground and cist tombs are found throughout the periphery of the habitation area, usually in areas unsuitable for structures. There is at present no evidence of habitation structures or other architectural features. The area today is intensively cultivated.

The site is unfortified, and there is no *pukara* near the area. The Altiplano Period pottery is a distinct type that we have named Kelluyo. Kelluyo has two varieties: Kelluyo Black on Red and Kelluyo Black on Orange. This pottery represents a distinct ceramic assemblage in the far southern

²² We thank Ing. Pedro Huallpa Ch. for his assistance to our survey of the area above the town of Kelluyo. We further express our gratitude to the Alcalde and people of Kelluyo.

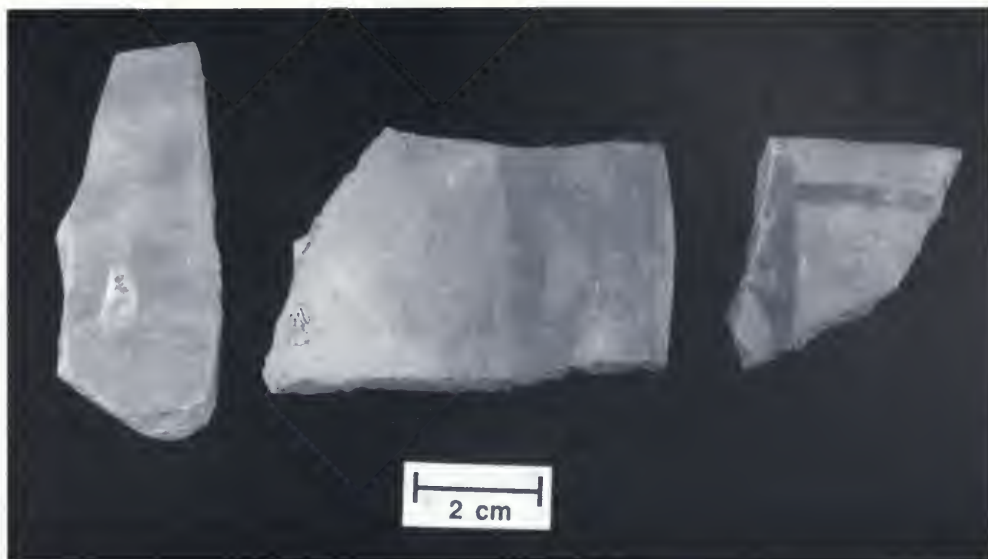


FIG. 82. Kelluyu ceramic artifacts from Chontacolla.



FIG. 83. Site of Tanka Tanka.



FIG. 84. Late Horizon *chulpa* at Tanka Tanka.

zone of the study area. This type is better fired than the contemporary Pucarani type ceramics in the Juli–Pomata area. Kelluyo is characterized by a deep bowl form, with black paint carelessly applied to the interior surface. Vessel walls tend to be thicker than the Pucarani type. Tempering material is sand and mica.

Linquinchira (Linquinchita)²³

This Middle Formative through Early Colonial site was first recorded by Hyslop in his dissertation (1976). He correctly located the site south of Desaguadero “on the eastern and southern edge of a rock outcrop 100 meters west of the Desaguadero River” (Hyslop, 1976, pp. 261–262). He furthermore described the site as about 5 ha in size and stated that “the eastern side is principally a large platform 50 by 100 meters with piles of stones on it possibly indicating habitations. The

southern section of the site has a number of cist graves and at its western end there is a platform of about 50 by 50 meters with cist graves in it” (Hyslop, 1976, p. 261). Hyslop included the cemetery area as part of his site size calculation. We estimate the size of the habitation area as about 2 ha, with the large platform noted by Hyslop as the principal location of aboriginal domestic structures. We furthermore confirmed the existence of tombs in the area mentioned by Hyslop.

Linquinchira is a type 4 site in our typology for the region, characterized by large and wide domestic terraces and an absence of corporate architecture. The large platform noted by Hyslop (1976) would constitute a very large domestic terrace, with additional smaller terraces located along the eastern hillside of Vilamaya, down to the modern road.

The artifact density of Linquinchira is quite high. Surface artifacts include post-Late Archaic projectile points, a finely made nonprojectile lithic assemblage made of a wide variety of nonlocal materials, copper ore, andesite hoes and adzes, and well-made ceramic artifacts. Ceramic styles from all time periods beginning with the Middle

²³ The official 1:25,000 Desaguadero map (hoja 34y-I-NE) uses the name Linquinchita. However, all informants were adamant that the name was pronounced with an “r” and not a “t.”



FIG. 85. Redressed *chulpa* at Tanka Tanka.

Formative through Early Colonial are found on the site. The Middle Formative, Upper Formative, and Tiwanaku periods constitute the principal occupations of the site, with smaller scatters of Altiplano, Late Horizon, and Early Colonial diagnostics. The site is located adjacent to prime raised-field agricultural land. There is a major aqueduct about 500 m south of the site that fed the raised fields near Quintuvincolla. This aqueduct is associated with both the Chincane and Linquinchira sites.

Tanka Tanka and Surrounding Area (Figs. 83–86)

The site of Tanka Tanka was first reported by Vasquez et al. in 1935. They noted that the site was located on a very prominent massif that is part of an east–west-tending chain of uplifted hills in a very broad pampa. The site has a number of outstanding *chulpas* built in fieldstone, cut stone, and adobe (Figs. 84, 85). Tanka Tanka was further described by Hyslop in 1976. He described the massive fortification walls: “The walls are

redressed on their exterior and in their bases there are often stones up to two meters in height. Walkways two meters wide are observed in places behind and below the tops of the walls” (Hyslop, 1976, p. 335). There are five major walls that reach as high as 7 or 8 m (Fig. 86).

Hyslop (1976) noted the extensive habitation area to the southwest, with the remains of hundreds of circular structures. He suggested that the habitation area of the site covered about 100 ha. We believe that most of the area inside the higher walls was not used as permanent habitation and accordingly we suggest a permanent habitation area of about 50 ha. Nevertheless, in spite of our lower estimate of the residential area, the total area of domestic architecture on this essentially Altiplano Period site is enormous. Tanka Tanka is a site of fundamental importance to the entire study area, and it must be mapped, excavated, and intensively analyzed.

Artifacts on the surface of the site are overwhelmingly Altiplano Period in date, although Late Horizon sherds are noted in some areas, particularly near the *chulpa* burials. Tanka Tanka therefore ranks as one of the largest major *pukar-*



FIG. 86. Fortification wall at Tanka Tanka.



FIG. 87. Site of Tintinpujo.

as in the entire southwestern Titicaca Basin, if not the largest in total habitation area.

Hyslop (1976) also noted the existence of numerous cist tombs in the pampa area below the site. We corroborated this observation. There were clearly hundreds or thousands of below-ground cist tombs that probably coexisted with the above-ground *chulpas* on the site. A curious fact about at least three of the *chulpas* on the site is that they were reconstructed at a later date. That is, three *chulpas* (at least) were originally fieldstone "igloo" types that were re-dressed with either cut stone blocks in Inca style or with adobe (one case). These *chulpas* are typical of the Juli area, such as those found at the Huacani site. This fact suggests that the original tomb of an elite was rebuilt or enhanced in the Late Horizon Period. There are very few Late Horizon artifacts, however, on the surface of the habitation areas of the site. This would suggest that the site was generally abandoned after the Inca conquest but remained an important ceremonial/burial place for the local Lupaqa elite.

North of Tanka Tanka are other massifs that rise out of the pampa. One of these, Ichucollo, was described by Hyslop (1977, pp. 296–299). The site contains *chulpas*, petroglyphs, and associated habitation areas. West of Tanka Tanka are at least two minor *pukaras* that were not ground-checked. These sites are typical of minor *pukaras* in the Juli–Pomata survey area. The Tanka Tanka site and surrounding area were therefore major settlement locations during the Altiplano Period.

Tintinpujo²⁴ (Fig. 87)

Tintinpujo represents a complex of artifact concentrations located along the north side of the Cerro Vilamaya in the Desaguadero region. Habitation refuse is found on an area of at least 300 m along the base of the hill, along low, wide ter-

aces and on top of low hills (between 50 and 100 m wide, producing a habitation zone between 1.5 and 3.0 ha in size). The site was not defended. Today the area is cultivated, and there are no remaining residential structures.

The entire area is considered a single site, although the density of surface artifacts varies throughout the area. The diagnostics are exclusively Altiplano and Late Horizon Period in date. Tintinpujo therefore represents one of the largest Altiplano Period settlements away from any major *pukaras* in the region.

This Altiplano Period site has the distinctive ceramic bowl types that we have named Kelluyo. Both Kelluyo Black on Red and Kelluyo Black on Orange are found on the site. Given the distinctive ceramic styles in the Desaguadero area (and see the site description of Kelluyo above), we argue that Tintinpujo and the surrounding area was home to a distinctive cultural tradition in the Altiplano Period. There seems to be less emphasis on fortified site location in this area. Tanka Tanka is apparently one of the last major *pukaras* to the extreme southwest of the Titicaca area. Although an occasional minor *pukara* is found in the area, the major location of conflict in the region, as evidenced by the existence of major *pukaras*, is more on the western and southwestern lake side. It is important to note that Albarracin-Jordan and Mathews (1990) did not find any fortified sites in the Tiwanaku valley itself. Likewise, we noticed no major *pukaras* near the sites in the Kelluyo region (see above). In short, there appears to be a general correlation between the Pucarani type ceramics associated with the Lupaqa polity in the Altiplano Period, and fortified site types, indicative of conflict. In the extreme south of the study area, a different tradition, contemporary with the Lupaqa, existed. In this latter area, perhaps outside of the area of Lupaqa political influence, there was considerably less conflict, as evidenced by the lack of fortified sites south of Tanka Tanka. The lack of *pukaras* in the Tiwanaku valley corroborates this proposition.

²⁴ Not to be confused with the site of Tintinpujopata, located in the Chatuma Pampa area.

The Settlement History of the Southwestern Titicaca Basin

Charles Stanish

The survey and reconnaissance of the southwestern Titicaca Basin provides a systematic database for addressing many anthropological problems in the prehistory of the region. In the preceding chapters we provided settlement data, typologies, and data from our research. Detailed settlement locations and ceramic drawings are found below. In this concluding chapter I summarize the results of this research in relation to some of the more important problems in the archaeology of the southwestern Titicaca Basin.

The Formative Periods

The Early Formative occupation in the study area represents the first settled villages in the Titicaca region. The earliest permanently occupied sites in the Juli–Desaguadero area are represented by small, undifferentiated hamlets that appear to be no more than 1 ha in size, and probably were much smaller. The first settled agricultural populations developed out of a hunting, collecting, and fishing economy of the Late Archaic. These Early Formative sites are generally located on low hills, and they are sparsely spread over the landscape. There is no evidence of conflict, and the sites are concentrated on economically rich areas near the lake. The Early Formative settlement pattern in the Juli–Pomata intensive survey area suggests an optimizing strategy aimed at securing access to lacustrine, horticultural, and *puna* grazing areas. The settlement pattern is more or less evenly distributed, with some clustering in the richer ecological zones.

The Middle Formative occupation of the region

was substantial, both in size and complexity. This period saw the formation of ranked societies, often referred to in the literature as simple chiefly societies, in the study area. The formation of ranked society in the Juli area occurred later by several centuries than in either the northern Titicaca Basin, in the Qaluyu area, or in the southern basin, at Chiripa. In these latter areas, ranked societies appear to have developed by at least 1100 B.C., possibly earlier.

There were at least two political centers during this period: the site of Palermo, which was at least 4.0 ha in the Middle Formative Period, and Ckackachipata, which was at least 5.0 ha. The site of Kanamarca may have also been a major center, on par with Palermo, Ckackachipata, and Chiripa during its Middle Chiripa Period. The nature of the political and economic relationships among these Middle Formative polities remains poorly understood, but it is clear from our work that they were certainly not related to the Qaluyu polity to the far north, although there was stylistic borrowing, as seen in the ceramic assemblage at Tumatamani (Stanish & Steadman, 1994, pp. 72–75). The ceramic styles in both polities (Early Sillumocco and Early Ckackachipata) show stronger borrowing from the Chiripa polity, but again, the ceramic assemblage in at least the Juli region (Early Sillumocco) was locally manufactured and not incorporated into the Chiripa polity in any formal sense. The situation with the Ckackachipata polity is less clear, and it is geographically closer to the Chiripa area. Without an intensive ceramic attribute analysis, like that conducted by Steadman for the Sillumocco area, we cannot draw too many conclusions from the surface artifact data.

However, we recovered no Qaluyu-like fragments from the reconnaissance area, and preliminary observations suggest that there were more Chiripa imports in the Ckackachipata area.

The Middle Formative settlements in the Desaguadero area also remain poorly understood regarding their political and economic relationship to the Chiripa area. Clearly, there was a substantial Middle Formative settlement concentrated along the Desaguadero River and southern edge of Lake Titicaca. Ceramic diagnostics are related stylistically to Chiripa, but again, without an intensive analysis, the precise relationship remains unknown. Theoretically, we would expect there to be an additional comparable polity in the Desaguadero River area, particularly along the rich raised-field areas along the river. We found no site comparable to Palermo, Ckackachipata, or Kana-marca in size or complexity in the Desaguadero reconnaissance area. However, it is quite possible that such a site exists on the Bolivian side of the river.

The Upper Formative Period is defined by the formation of societies characterized by a highly ranked political structure and correspondingly complex economic system. Archaeological research on the Upper Formative Period in the Titicaca Basin has historically focused on two areas: northern Collao and southern Pacajes. These are the areas of Qaluyu/Pucara and Chiripa/Tiwanaku, respectively. This bias in the research has led to an implicit or explicit view of the Titicaca Basin as being characterized by these two principal centers of cultural development that influenced, to varying degrees, neighboring areas. In many ways this view is reminiscent of the notion of nuclear centers of civilization, that of the “generators” of great art styles and culture that subsequently diffuse out to other areas. For instance, all decorated ceramic assemblages and carved stelae are evaluated as to whether they are in the Chiripa/Tiwanaku traditions or are more related to Qaluyu/Pucara types. Sites in between these two regions are identified as “Chiripa,” “Qeya,” “Pucara,” and so on, on the basis of a few decorated surface sherds without regard to the rest of the assemblage or other site characteristics.

The Juli–Desaguadero data indicate that our traditional view of the Upper Formative Period must be revised. I argue that the prehistoric cultural landscape of the circum-Titicaca Basin is far more complex than currently accepted, and that this is particularly true for the Upper Formative. The Upper Formative was a time of intensive po-

litical development of numerous, autonomous and semi-autonomous, complex chiefly polities. At least four, and most likely many more, polities existed immediately prior to the development of Tiwanaku. These would include Pucara, Chiripa/Qeya, Late Sillumocco, and Late Ckackachipata. We hypothesize additional similarly complex polities, such as those represented by the site of Kanamarca and those possibly existent in the Desaguadero and Omasuyus area. The work of Portugal Ortiz (1988) at the site of Titimani stands as one such example for the eastern lake region.

Consistent with anthropological theory on complex chiefly societies, political boundaries were most likely fluid, as competitive relationships and alliances between different groups constantly shifted. We expect certain “pan-Titicaca Basin” art styles to be interpreted in slightly different ways in different polities. This would be particularly evident in stone sculpture, ceramic vessels, and the like. At our excavations at Tumatumani, for instance, we observed significant “borrowing” of styles from both the north and south basin, plus a local “Juli” style best represented by Sillumocco polychrome ceramics.

The discovery of the Late Sillumocco and Late Ckackachipata polities raises the question of their relationship with Pucara and Qeya. We can more or less define the southernmost limits of the Pucara settlement and/or influence in the western Titicaca Basin. Alfred Kidder reconnoitered the northern basin, and part of his survey covered the Ilave area (Kidder, 1943, pp. 10–15) south of Chucuito. He described three Tiwanaku sites in the region, including Incatunhuiri (Kidder, 1943, p. 13), Asiruni, and Sarapa (Kidder, 1943, p. 10). Incatunhuiri is located near Ichu, directly northwest of Chucuito. Asiruni and Sarapa are located just north of our study zone in the Ilave Pampa. Incatunhuiri is a large, terraced hill that has both a Pucara and Tiwanaku occupation. It also has a semisubterranean sunken court with carved stone stelae. Asiruni and Sarapa did not produce many Pucara sherds, according to Kidder (1943), and the rare occurrence of some incised wares does not constitute sufficient evidence for assigning these sites a Pucara cultural affiliation. Rather, they appear to be Sillumocco or Sillumocco-like sites, with a major Tiwanaku occupation after A.D. 400. We found no Pucara sites in the Juli–Desaguadero research area. The southern limit of Pucara settlement is therefore located somewhere between Incatunhuiri and the Ilave Pampa, the northernmost limit of our survey.

In the southern Titicaca region, I argue that the first complex chiefdoms in the Titicaca region are represented by the Mamani phase, or Late Chiripa, in the Chiripa area. Chiripa Mamani dates to 400–100 B.C. in the Browman (1980) chronology and would correspond to Late Chiripa in the Chávez chronology, ca. 650–200 B.C. (Chávez, 1988a, p. 2). During this time, the first complex storage structures and semisubterranean temple were built at the site (Browman, 1980, p. 809). I argue that the construction of this major corporate architecture correlated with the development of a complex chiefdom at Chiripa. The mound was formally walled and faced in the preceding Middle Formative or Chiripa Llusco and Chiripa Condori phases. The inhabitants of Chiripa in this earlier time had built a plaza area on the mound proper (Browman, 1980, p. 808). In the Upper Formative, the plaza area was replaced with a formal, walled, semisubterranean temple area. In other words, the earlier plaza area was formally walled off with a construction technique that was to become typical of elite architecture in Titicaca area.

After the Mamani phase, Browman (1973) reported a hiatus in the occupation of Chiripa, with a rebuilding of the temple area around A.D. 400. This rebuilding would correspond to the later Qeya period (Browman, 1978, p. 809).²⁵ Ponce Sanguines (1981) assigns an average date of A.D. 299 for the Tiwanaku III or Qeya Period, a date with which I generally agree, based on our admittedly limited database. In his excavations at Lukurmata, Bermann (1994) obtained a single calibrated date of A.D. 430 \pm 80 from a house floor with associated Tiwanaku III or Qeya ceramic fragments. Qeya is therefore contemporary with Late Pucara, Late Sillumocco, and Late Ckackachipata. The most appropriate interpretation of the data at the present time suggests that Qeya dates to approximately A.D. 200–400.

As we just noted, in the study area the two polities of Sillumocco and Ckackachipata in the Middle Formative Period continued on into the Upper Formative. In the Juli–Pomata area, quantitative data indicate that during the Late Sillumocco Period raised fields were extensively utilized. In the Chatuma area of the Ccapia reconnaissance area, extensive Ckackachipata sites are associated with raised fields. Based on these settlement data, raised fields were the most important component of the regional political economy. In

the Juli–Pomata area, for which we have good quantitative data and 100% coverage, the number of Upper Formative sites actually decreased from the Middle Formative, but the mean size of individual sites and the total population increased. Mean site size in the field areas almost quadrupled, and these sites were dramatically larger than average site sizes for the period as a whole. Most dramatic is the population movement away from the non-raised-field *suní* zone, in the center of the survey area, toward the raised-field zones where almost 63% of the population lived. Two of the river-edge Moyopampa sites in the Early Sillumocco Period were abandoned for a naturally high area nearby. Furthermore, two additional sites were built on the edge of the Moyopampa zone, indicating that most of these relict fields were probably in use.

The immediate periphery of the field area (within 1 km) was the optimal settlement location for populations utilizing the raised fields. Distances of more than 2 km were inefficient, and settlement directly in the swampy field areas would be cold, damp, and less desirable than in the low hills ringing the field areas. The settlement data therefore indicate a shift from the earlier period to an optimal “ringing” of the field areas near aqueducts and canals. This patterning is highly suggestive of a more formal organization of production than in the Early Sillumocco Period.

In the Desaguadero reconnaissance area, we also found a number of Upper Formative sites. We can very provisionally hypothesize a distinct polity in this region at this time, but intensive surface survey and intensive artifact analyses are necessary to define these with greater precision.

The Expansive Tiwanaku Period

The Tiwanaku presence in the southwestern Titicaca Basin was substantial. Our data support a model of Tiwanaku as an expansive state political system (Kolata, 1983, 1986). We have demonstrated that the Juli–Desaguadero area was heavily populated in the Tiwanaku Period. Settlements are concentrated along the lake, and they decrease in density in the *puna*. The survey data indicate that the Tiwanaku state maintained particularly strong political control in this region during its later phases, most notably ca. A.D. 800–1000. It is also likely that the earlier Tiwanaku Period settlement, ca. A.D. 400–800, was also heavily represented in the study area. There was no Early Tiwanaku set-

²⁵ Browman refers to this period as the Tiwanaku occupation, ca. A.D. 400–800.

tlement (pre-A.D. 400), although the existence of an occasional example of trade ware suggests contacts between the Upper Formative polities and the pre-Expansive Tiwanaku Period.

Our data from the Juli–Pomata intensive survey area indicate that there was little change in settlement patterns between the Upper Formative and the Tiwanaku Period. Only two out of eleven major Upper Formative sites (1 ha or larger) in the intensive survey area were abandoned in the Tiwanaku Period. Excavations at Tumatumani, Palermo, and Sillumocco–Huaquina indicate that there was no hiatus in the occupation. In other words, the Tiwanaku state expanded into an already complex political and economic context with the incorporation of the Sillumocco polity around A.D. 400.

Similar patterns of settlement continuity are suggested by the data from the Ckackachipata polity and Desaguadero reconnaissance areas. Tiwanaku occupations are generally found associated with Upper Formative sites in the reconnaissance regions, a pattern similar to that of the Juli–Pomata area. Raised fields are strongly associated with Tiwanaku sites, corroborating the data from the Juli–Pomata region. We may presume that, in the same way that the Tiwanaku polity incorporated the Late Sillumocco polity, it also absorbed the Ckackachipata and related polities to the south.

The lack of any growth spike during the Expansive Tiwanaku Period in the Juli–Pomata intensive survey area is instructive and contrasts markedly with the Altiplano/Inca Period transition. Although we accept the notion of Tiwanaku as an expansive polity of some power and influence, these population data suggest that one component of Inca political economy—mitimaes—were not part of the Tiwanaku strategy, at least in the Juli–Pomata area. We therefore believe that it is inappropriate to use the Inca state as a direct analogy for the Tiwanaku. Populations do not seem to have been moved into the region as colonists, a very stark contrast to the population patterns evident in the Inca Period.

The Tiwanaku peoples constructed an archaic expansive state of impressive proportions. However, unlike the Inca, they either lacked the ability or the resolve to move large populations under their control. Tiwanaku expanded into an already complex political and economic context in the Upper Formative, as represented by the Late Sillumocco and Late Ckackachipata polities in the survey and reconnaissance areas. The strong con-

tinuity in settlement patterning between the Upper Formative and Tiwanaku periods suggests a co-option of existing political and economic institutions by the Tiwanaku state, as opposed to the imposition of new ones, as seen in the Altiplano/Expansive Inca transition. The Tiwanaku state maintained and intensified raised-field agriculture. In fact, based upon geographical locational data, the Upper Formative and Tiwanaku economic strategies were strikingly similar, exhibiting similar proportions of the population located in the raised field, terrace agriculture, and pasture lands, respectively.

The settlement data indicate that the Tiwanaku population maintained a mixed economy of intensive and extensive agriculture, pastoralism, lake resource exploitation, and regional exchange. Intensive agriculture is represented by the raised fields. These fields date to the Tiwanaku Period, as evidenced by the location of major Tiwanaku sites adjacent to aqueducts, canals, and the fields themselves. Extensive agricultural practices were represented by rain-fed terraced agriculture, typical of the area today. A number of Tiwanaku sites are found away from the raised-field areas and geographically associated with rain-fed agricultural terraces. In short, both raised-field and non-raised-field areas were occupied by Tiwanaku sites.

The Tiwanaku settlement combined a heavy lakeside focus with settlements in the other ecological zones. The lakeside focus is indicative of the exploitation of the lake resources, although this proposition needs to be refined using excavation data. A few Tiwanaku sites are also found in the high *puna* area more than 4000 m.a.s.l., a settlement pattern that suggests control of camelid grazing lands. The number of Tiwanaku sites in the *puna* is small, however, compared to the later Altiplano and Late Horizon periods.

The coexistence of a locally manufactured Tiwanaku imitation pottery, along with imported polychromes, indicates the existence of a trade network of as yet unknown proportions or intensity. It is not known whether the locally produced ceramic type follows chronologically, as in Moquegua (Bermann et al., 1989; Stanish, 1991, p. 9–10), or simply represents a local imitation of the genuine Tiwanaku ceremonial pottery. The existence of the nonlocal finewares, most likely produced in or near Tiwanaku itself, is indicative of a complex exchange relationship between a distant state center and local populations. Likewise, the difference in site types may represent a

resident Tiwanaku administrative elite among a local support population. In this instance, it is fairly obvious that the type 3 sites represent elite centers, given the existence of semisubterranean temples, stelae, and the like. We can hypothesize that the other site types represent the local population, with the exception of the artificially mounded type 1 sites. This proposition remains to be tested.

It is instructive to compare the data from the Juli–Pomata intensive survey area with those from the Tiwanaku Valley collected by Albarracín-Jordan and Mathews (1990). In the first instance, there is a substantial pre-Tiwanaku 4 settlement in the Tiwanaku Valley. This is to be expected in the ancestral homeland of the Tiwanaku state. At Tiwanaku, there is an unbroken development of Tiwanaku settlement from the earliest Upper Formative Period (Tiwanaku I or Kalasasaya) to the dramatic expansion of Tiwanaku in its later phases. As I have just noted, the Upper Formative/Tiwanaku Period transition in the Juli–Desaguadero region is very different, with Tiwanaku replacing an already complex polity. Excavations at two elite/ceremonial sites indicate that they were architecturally enhanced in the Tiwanaku Period, an observation that supports political and economic continuity.

The number of sites in the Tiwanaku Valley is an order of magnitude larger than that in the Juli–Pomata area. In a total survey of approximately 400 km², Albarracín-Jordan and Mathews discovered 100 Tiwanaku IV sites and 339 Tiwanaku V sites (1990, pp. 7, 89, 130). The methodologies of the Tiwanaku Valley Project and the Lupaqa Project were similar. Likewise, the definition of a site is comparable in both projects. Therefore, the difference in settlement density between the Pacajes and Lupaqa area is empirically valid. Clearly, the core territory of Tiwanaku has a radically different and more intensely occupied history than the Lupaqa zone. The factors responsible for these different patterns in adjacent zones remain as central problems for future research.

The Altiplano Period

The Late Intermediate Period or Altiplano Period settlement system differs from all preceding periods. In functional terms, there are two types of sites: fortified sites, or *pukaras*, and nonfortified residential sites that tend to cluster near these *pukaras*. Furthermore, there are two types of fortified sites. The first type, major *pukaras*, are very

large hills surrounded by at least three walls with substantial architectural remains inside and immediately adjacent to the walls. The second type of *pukara* is characterized by small hills with surrounding defensive walls and very little architectural remains. These minor refuge sites are built in a manner similar to that of the major ones, but they are considerably smaller and much more numerous. Rarely do they enclose more than a few structures, and artifactual remains are meager.

In short, our data indicate a pattern of large Late Intermediate Period refuge sites more or less evenly spaced along the southwestern Lake Titicaca region (Fig. 88). These major refuge sites are roughly similar in size, architecture, and associated ceramic assemblages, although some variation within the sites is evident. Excavation data from at least one of these sites suggest that they were not permanently occupied but were used as temporary refuge sites for nearby populations in times of danger. Associated with these major refuge sites are dozens of smaller ones, located near undefended hamlets and villages. This pattern appears to be typical of the Lupaqa region as a whole.

We have identified a number of major refuge sites in the region between the Ilave Pampa and Copacabana. One pattern that is obvious is the relatively even spacing of the major sites. There is some variation in size between the major *pukara* sites, but it is significant that all sites are within the same order of magnitude. The largest sites are Pukara Juli, Tanka Tanka, and Cerro Carajuana, with three others—Huichajaja, Llaquepa, Pukara Chatuma, and Tanapaca—roughly equivalent in area. The actual size of the area enclosed by defensive walls appears to be more a function of topography than of population size.

All major refuge sites other than Cerro Carajuana were ground-checked. The remains of domestic architecture were found on all of the visited sites. The general architectural pattern is one of round houses built on domestic terraces. As with Pukara Juli, domestic architectural remains were found within the walls and immediately adjacent to the walls. Above-ground burial towers, or *chulpas*, are found within and near the fortified walls. Other *chulpa* cemeteries are found away from the sites themselves.

Ceramic collections were made at four of the five *pukaras*. The diagnostic material is uniformly Altiplano Period in date inside of the residential areas at each site. We have named the ceramic type Pucarani in the Juli–Pomata area and Kelluyo

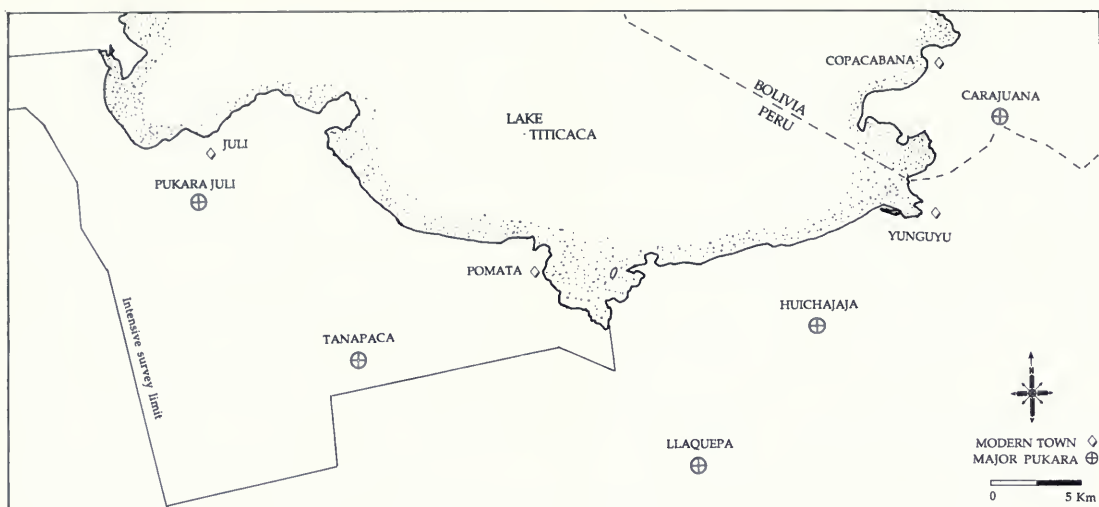


FIG. 88. *Pukaras* in study area.

in the Desaguadero region. Diagnostic Pucarani ceramics show strong affinities to pre-Inca Sillustani and Chucuito types from the Collao region of the north Titicaca Basin (Tschopik, 1946, pp. 21–44), although the Pucarani style is clearly a local type associated with the southwestern Titicaca area. There is some variation in the decorated ceramic styles among the five sites collected, but the Pucarani style is relatively homogeneous in the Juli–Pomata region compared to contemporary assemblages to the north (Tschopik, 1946) and the south (Albarracín-Jordan & Mathews, 1990).

One of the major questions facing the southern Titicaca Basin for the immediate post-Tiwanaku period is that of the hypothesized migration of Aymara speakers (see pages 12–14). Our data do not necessarily disprove or support this hypothesis. There is indeed a substantial change in settlement patterns in the Tiwanaku/Altiplano Period transition that could support this model of Aymara migration. These data, however, could also be explained by the dramatic political disruptions coincident with Tiwanaku collapse in the region. The probable drought around A.D. 1000 (Orloff & Kolata, 1993) may also explain these settlement changes, and in particular the shift from nucleated settlements near raised fields to a more dispersed pattern founded on camelid herding.

We would have expected to find fortified settlements in the Kelluyo and southern Desaguadero area to support the Aymara migration hypothesis. It is curious to have contemporary sites in the immediate lake region fortified while other sites

in the south were not fortified. The fortification of the settlements in the region correlates with the demographically dense areas near the lake, and it would therefore support models of internecine strife as opposed to a model of migrants moving into the region in fortified settlements. Furthermore, the Kelluyo ceramic type is distinct from that of the immediate lake area during the Altiplano Period. This suggests a cultural distinction between the two areas, another observation that would not support a southern migration of the Aymara in the wake of Tiwanaku collapse. In short, there is still much work to be done on this intriguing question. Linguistic and toponymic studies, combined with systematic archaeological work in the Caranagas area and the Lake Poopó region, will help clarify this problem.

Another significant question in Lupaqa area archaeology centers on the nature of political complexity in the immediate pre-Inca periods. This problem is addressed in detail in the study by Kirk Frye presented as Appendix 2 of this work (beginning on page 129).

The Inca Period

There was a massive Inca presence in the study area, including major population movements within and from outside the area. Three major differences distinguish the Inca Period from the previous Altiplano Period: the walled sites were abandoned, larger towns were founded, and

raised-field areas were abandoned. *Puna* land use was intensified (19% of total population), a process that began in the preceding Altiplano Period.

The Inca did not utilize raised-field areas, as indicated by site location and the derived population data. This was most likely due to the altered ecological conditions, specifically drought and lower average temperatures, beginning around the time of the Inca conquest. The Late Horizon settlement pattern is heavily weighted toward terraced agricultural and lakeside urbanized areas, suggesting a maximization strategy in the region that was designed to produce and move commodities and locate populations near optimal agricultural land.

One of the most dramatic characteristics of the Inca occupation is the growth spike after a generally steady growth rate that began in the Middle Formative Period. This growth rate could not occur from natural population increases alone. These data leave little doubt that substantial populations migrated into the Juli–Pomata region during the Inca Period. The growth spike during the Expansive Inca Period can be explained, we believe, by two principal factors. The first factor is methodological. The intensive survey zone covered two major Inca administrative sites, Juli and Pomata. Had the systematic survey continued into the Chatuma area and beyond, we might expect some flattening of the curve with the inclusion of more pre-Inca sites away from Pomata. Even with this extension of the survey, however, the growth spike almost certainly would still exist, although in a less severe form. This is supported by the discovery of numerous Late Horizon sites in the reconnaissance area.

The second explanation for the growth spike that accompanied Inca occupation relates to Inca policies of population relocation in the form of *mitimae* colonists (Patterson, 1991; D'Altroy, 1992). There are numerous historically documented cases of Inca *mitimae* colonists in the Titicaca Basin. A significant percentage of the new population was concentrated in the larger towns.

In particular, the towns of Juli and Pomata were founded in this period. Site size data for the Tiwanaku through the Inca periods indicate that there was a shift to a bimodal site distribution, with a few very large sites and a number of smaller villages and hamlets in the Inca Period.

The transition from the Altiplano to Expansive Inca Period suggests substantial changes in the political economy of the southwestern Titicaca Basin. The highest rate of site abandonment occurred during this period. Likewise, there was a significant change in site size distributions during the Inca occupation. Although the emphasis on small hamlets continued, the Inca built huge administrative settlements along the road system. In fact, approximately 50% of the population lived within 500 m of the road in the Juli–Pomata area. Presumably, much of the population in these centers consisted of imported colonists. Likewise, there was an intensification of pastoral and rain-fed terrace agricultural zones, and there was a virtually complete abandonment of the raised-field areas in the low pampas.

There is a surprising continuity between the Inca Expansive and Early Colonial settlement patterns, and presumably also in economic organization. From a political and economic perspective, the needs of the Spanish state were similar to those of the Inca, at least in the first generation. Through time, there was a shift away from altiplano products to mining. Concomitantly, there was a political shift from the highlands (Inca empire) to the coastal valleys, particularly the Spanish ports. The changes wrought in the wake of the Spanish conquest altered the political economy of the central Andes, resulting in the gradual decline of the Titicaca Basin economy.

The Early Colonial Period settlement patterns were similar to those of the Late Horizon. The general bimodal distribution, characterized by very large and very small sites, continued. There was an expansion into the *puna* and a continued occupation of the large towns originally founded by the Inca state.

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Appendix 1. Contemporary Aymara Agricultural Soil Categories²⁶

*Luperio Onofre Mamani*²⁷

In this report, I use a different approach, compared to typical agronomic studies, for analyzing and classifying soil types. This work is based on a number of interviews with Juli-area farmers, who have a lifetime of experience with managing agricultural soils. With this information, I have been able to reconstruct the typology of agricultural soils used by the farmers in the area today (Table 8). The creative and rational classification and utilization of these soil types provides an advantage to the farmers in optimizing production and minimizing risk from the vagaries of climatic conditions.

The quality and type of soil depend on several components, such as soil texture, climate, drainage characteristics, the presence or absence of rocks, vegetation, and climate conditions. Contemporary Aymara farmers in the Juli region recognize six different major land and soil types based on these criteria.

Soil Types

Type A: *Q'inko orake* or *wila lak'a* (tierra arcillosa)

This type is characterized by soils with a high percentage of red clay, a minimal number of rocks, and good soil texture. This soil is sensitive to rainfall levels; significant rainfall makes it very clayey, whereas low rainfall makes it very compact. In general, the color of the soil is red; it is easy to identify. It is generally found in the low areas, such as pampas, and along hillsides (*parqui chaka*).

According to our informants, this soil type is very fertile. It is particularly useful for tuber agriculture, principally the "sweet" potato (*wila imilla* or *papa dulce*). The planting should take place 1 or 2 months before the rainy season. This soil is also characterized by the presence of wild plants, such as *cebadilla*, *chijchipa*, *kentu*, *ichu*, *muni muni*, *amicaraya kora*, and others. In some areas where the climate is warmer, this soil is extremely fertile, and one can grow maize, alberja, wheat, some vegetables, and other fertility-sensitive crops.

This soil type is occasionally used for the construction of raised fields or *jake kolli*, as they are known in the Juli region.

Type B: *Ch'iara orake* or *ch'iara lak'a* (tierra negra o ceniza)

This soil type is black or gray in color (similar to ash), clayey, has a good texture, and is moderately good at water regulation. Another characteristic is its relative lack of rocks and the common occurrence within it of wild altiplano plants such as *kora* and *muni muni*. This type of soil is found in the pampas and *quebradas* with a cold climate (*hupi chakanaka*) and sometimes in a sheltered location (*junt'u chakanaka*). It is good for the cultivation of Andean tubers, most notably the black potato (*Chhiar imilla*), a potato called "cow tongue" (*waka lajra*), beans, and cebada.

According to the farmers, this soil is good for planting because it is fertile and resistant to adverse climates. Occasionally raised fields are constructed in these soils.

Type C: *Paqo orake* or *qella lak'a* (tierra marrón)

This soil type is highly variable and not easily characterized with the usual agronomic terms.

²⁶ Translation by C. Stanish.

²⁷ Lic. Onofre, a member of the Lupaqa Project since 1988, is a native Aymara speaker and is from the Juli area.

TABLE 8. Soil types according to Aymara informants.

Variables	Type A	Type B	Type C	Type D	Type E	Type F
Color	Red	Black/gray	Brown/gray	Clear gray/brown	White	Brown
Texture	Clayey	Clayey	Sandy loam	Sandy	Clayey with rocks	Clayey with rocks
Water retention	Good/bad	Regular	Good	Regular/poor	Regular	Poor
Presence of rocks	Few	Few	Few	Few	Few	Many
Wild plants	<i>Cebadilla, kentú, chijichipa, ichu, muni muni, kora, amicaraya</i>	<i>Kora, muni muni</i>	<i>Llapa, kora</i>	<i>Kentu, kora, muni muni, totora, cebadilla</i>	<i>Kora, chijichipa</i>	All types of wild plants
Geography	Low areas or pampas, hillsides	Low areas or pampas, <i>quebradas</i>	Terraces, <i>quebradas</i> , pampas	Pampas, edges of lake, edges of rivers	In all areas	High areas, hills, rarely in pampas
Cultivars	<i>Papa dulce</i> , maize, oats, vegetables	<i>Papa negra, waka laira</i> , beans, barley	Potato (<i>pakoya</i>), <i>chikilla, papa negra</i> , beans	Barley, beans, <i>papa blanca</i>	<i>Papa amarga (luk'i)</i>	Mainly oca
Soil quality	Good	Good	Regular	Regular	Poor	Regular—poor
Climate	Temperate—cold	Temperate—cold	Cold	Temperate—cold	Cold	Cold
Fertility	Regular—good	Good	Regular	Regular	Poor	Regular—poor
Raised fields	Few	Few	None	Many	Some	None

The informants consistently identified this soil type as brown in color and having few rocks. They also noted that the wild plants *llapa* and *kora* were common within it. However, in some cases they described it as having a good texture and good water-retention capacities, but in other cases as having poor texture and poor water-retention qualities. Likewise, the fertility of the soil varies as well, according to the climatic conditions of the area.

This soil is most common on agricultural terraces on the hills (*kollo pata*), *quebradas* (*huasara p'uchunaka*), and in rare instances in the pampas (*phutunku chakanaca*). This soil is favorable for the cultivation of potatoes (*chokke*), particularly the following varieties: *p'akoya*, *'chikilla*, and *papa negra*. Oca (*apilla*) and beans (*habas*) also grow well on this soil type.

Type D: *Ch'alla orake* or *ch'alla lak'a* (tierra arenosa)

This soil is characterized by a light gray or light brown color, a very high percentage of sand, poor texture (with the exception of areas with abundant pasturage (*ch'ijji*), and poor water-retention capacities in abnormal weather but good capacities when rainfall is normal. Wild plants are abundant, particularly *kentu*, *kora*, *muni muni*, *ch'ijji*, *tatora*, and *cabadilla*.

The informants say that this soil is risky for cultivation. In good weather, particularly near some areas of the lake where it is slightly warmer, known in Aymara as *kota jump'i*, this soil is very productive. However, the soil is very dangerous in periods of frost, given its poor texture, which permits root damage much more easily than other soil types. Furthermore, with too much rain, this soil type saturates quickly and does not drain well. It is precisely for this reason that type D soils are best for raised fields (*jake kolli*). According to our informants, the *jake kolli* should be

constructed in areas of abundant vegetation (*chijji pampanaka*). The advantage of this agricultural system is the control of frost damage due to the presence of canals that keep the area slightly warmer. Furthermore, the "humus" that forms in these canals is used as fertilizer to improve the soil.

Type D soils are found largely in the pampas or edges of the rivers and lake (*jahuir lake y kota lake*). The best crops for this soil type are cebada, beans, and *papa blanca*, respectively.

Type E: *Jhank'u orake* or *alex lak'a* (tierra blanca o tierra corriente)

This soil type has a normal texture, moderate water-regulation capacities, few rocks, and a high quantity of the wild plants *kora* and *chijchipa*. The soil quality overall varies from average to bad. Furthermore, these soils are susceptible to frost damage and exist in areas that are referred to as uncultivated and arid.

The "white" soils are found on the hills and pampas. Only the bitter potato can be cultivated with any guarantee of good results.

Type F: *Chajjwa lak'a* or *chajjwa orake* (tierra pedregosa)

These soils are brown in color, with a poor texture, poor water-retention capacities, and a high quantity of rocks. The overall quality of the soil is poor. They are found on the high areas of the hills and along the hillsides (*parki chakanaka*). They are almost always terraced in what is, according to the informants, an attempt to improve water retention, conserve fertility, and protect against frost. Type F soils are occasionally found in the pampas. The most appropriate cultivar for this type of soil is oca (*apilla*), a plant that is drought-resistant.

Appendix 2. Political Centralization in the Altiplano Period in the Southwestern Titicaca Basin

Kirk Lawrence Frye

The accounts of Lupaqa political organization in the 16th century suggest a complex hierarchical system headed by a hereditary ruler who controlled several lower-order administrators within the six other *cabeceras*. What the documents do not make clear is whether 16th-century Lupaqa political organization reflects Inca influence or whether the descriptions of a stratified Lupaqa social and political organization describe a pre-Inca political system. The traditional histories are ambiguous. One interpretation of a paragraph from the chronicle of Bernabé Cobo, for instance, is that the Lupaqa built their hilltop fortifications as a direct response to the Inca incursion into the Titicaca Basin:

On this expedition the Inca subjugated all the towns and nations who defended themselves bravely, and they had many clashes with the Inca before they were subjugated. The Inca subjected many of them to a relentless siege, and they built forts in order to defend themselves, such as those at Caquingora and the one we see on a high hill near the town of Juli

(Cobo, 1956[1653], p. 140)

With this account, Cobo seems to imply that the Lupaqa were not politically unified and that the defense of each town was organized by local leaders rather than by a central ruler. This proposition is supported by Julien's interpretation of the available ethnohistoric material, when she suggests that the pre-Inca Lupaqa political landscape might have been characterized by internally competing groups (Julien, 1978, p. 61).

The account of Cieza de León, in contrast to that of Cobo, suggests that Lupaqa political complexity and unification predated the Inca intervention in the region. According to Cieza de León, a Lupaqa "king" known as Cari succeeded in unifying a number of towns in Lupaqa territory before the arrival of the Inca (Cieza de León, 1959[1553], p. 274). Describing a battle before

the Inca arrival between Cari and Zapana, the Lord of the Collas to the north, Cieza de León says: "Cari emerged the victor. But as he aspired to no other honor or power beyond robbing and destroying the villages, loaded with booty, without taking captives, he returned to Chucuito [on Lake Titicaca], which he had made his seat, and by his orders the villages of Hilave, Xulli [Juli], Zepita, Pumata [Pomata], and others had been settled" (Cieza de León, 1959[1553], pp. 215–216).

In order to determine the level of Lupaqa political complexity during the Altiplano Period, data collected during the Juli–Pomata systematic survey as well as data from four major fortified sites—Huichajaja, Llaquepa, Tanapaca, and Pukara–Juli—were intensively analyzed. The latter two sites are located within the Juli–Pomata intensive survey area boundaries. Data used to compare these sites include the results of an analysis of both plainware and decorated ceramics and site architectural patterns.

One of the criteria for defining the degree of political centralization is whether or not spatially distant sites were integrated into a single regional political hierarchy. Although differences in site sizes have traditionally been used to identify hierarchical political systems, I argue that a study of site sizes alone is insufficient for accomplishing this. Along with size differences, the distribution of decorated ceramics on sites of different sizes and types is a second useful marker.

The analysis of Altiplano Period settlement systems incorporates only sites that have well-defined habitation areas and contain clearly identifiable Altiplano Period ceramics. I exclude cemetery sites. For the purposes of the settlement analysis I focus on major fortified sites, nonfortified sites, and temporary refuge sites. Major fortified sites are all classified as centers, refuge sites fall into the size categories of small and large villages, and nonfortified sites fall into all size cat-

egories. Although no systematic studies of non-fortified and temporary refuge sites have yet been undertaken, the ceramic samples collected from these site types during the systematic regional survey are sufficient for indicating whether or not high-status artifacts are associated with them.

Architecture

The method for defining different levels of Lupaqa political organization depends on the ability to identify similarities or differences in architectural styles and spatial organization patterns at four major fortified sites. My approach to defining different levels of social and political integration builds on the work of Steponaitis (1991, pp. 219–220). He showed that differences in patterns of site layouts at Mississippian sites correlated with different levels of chiefdom political complexity. I operate under the assumption that similarities or differences in architectural styles can be an indicator of whether separate archaeological sites were either part of a unified political system or represent localized political groups.

If the people living in the Lupaqa territory during the Altiplano Period were organized at the level of a complex chiefdom, I would expect features typical of centralized polities, such as the existence of areas for tribute collection, processing, and storage, heightened craft production, and politically charged ceremonial activities. Furthermore, the architecture associated with elite residences and activities should be clearly demarcated from other areas of the site where more mundane tasks are carried out. The architectural styles used to build important structures are expected to be similar between the centers of local chiefs, because elite individuals derive political authority by being identified with standard symbols of power. These symbols are frequently reflected in elite architecture styles.

Conversely, if populations who used different major fortified sites were not politically integrated, these sites would not be characterized by formalized site layouts, would be expected to lack evidence of specialized work areas, and would be expected to show variation in architectural styles between centers. The presence of different architectural styles, seen in structure shape and adornment, fortification wall construction, or doorway styles at different major fortified sites, will be in-

terpreted as indicating that the Lupaqa major fortified sites were not politically integrated.

Methodology

MAPPING SITE ARCHITECTURE—Areas within major fortified sites with the most architecture were chosen for detailed mapping. Site layout data were obtained by mapping a small but representative section of each site at Huichajaja and Llaquepa; approximately 1 ha of each area was mapped. One of the four residential areas at Pukara Juli, called Yacari–Tuntachawi and covering an area of approximately 5.0 ha, was mapped. Tanapaca was not systematically mapped, but a detailed sketch of the site was made in the field. The second step was to compare the building styles of major architectural features located within the sites, including fortification walls, doorways, and structure shapes. The third step was to measure a representative sample of the structures in order to determine the range of structure size. The number of structures that were measured represents only a portion of those found at each site.

CERAMIC ARTIFACTS—The ceramic analysis focuses on three basic elements needed to determine whether the Lupaqa major fortified sites were politically integrated. The elements we compared were (1) the pastes used in the production of decorated ceramics at major fortified sites, (2) vessel rim diameters, and (3) decoration style and vessel form between different major fortified sites.

If Altiplano Period fortified sites functioned as different centers within a unified and ranked polity, it is anticipated that decorated ceramics found at those sites might indicate redistribution from a centralized production center. To determine centralized ceramic production, I compared the ranges in rim diameters within functionally specific ceramic classes, and the paste composition of decorated ceramics from the different sites. At the least, if the major fortified sites in the study were politically integrated, decorated ceramics from those sites should show strong similarities in, among other elements, decoration use, rim shape, and vessel form. Conversely, if Altiplano Period major fortified sites were the centers of simple chiefdoms, the decorated ceramics within each site would be expected to show evidence of local, nonstandardized production. In this study, decorated ceramics are defined by the presence of painted decorations, such that ceramic examples

that are either slipped or contain rim slips are not considered decorated.

The analysis of ceramics from the major fortified sites also helps to establish the function of these sites. First, if major fortified sites represent the highest level of a settlement hierarchy, then it is expected that they would have been the residences of the local elite. Therefore, major fortified sites should contain many more decorated ceramics than unfortified sites. If major fortified sites were only used for temporary refuge centers it is expected that nonfortified sites occupied by rulers could be identified and would contain as many if not more examples of decorated ceramics than those found within major fortified sites. Because no systematic surface collections have been made at nonfortified sites, the ceramics from those sites cannot be systematically compared to the ceramics from major fortified sites. However, the non-systematically collected ceramic samples from nonfortified and temporary refuge sites during the survey are sufficient for determining how well represented decorated ceramics are at those sites.

Second, the kinds of ceramics used at the major fortified sites can indicate whether they were used in conjunction with important political and or ritual activities. For instance, Costin (1986, pp. 294–299) showed that specific containers, principally large jars and bowls, were associated with elite feasting ceremonies at the site of Tunanmarca in the Mantaro valley. If major fortified sites were the centers of religious or political activities, then the ceramic assemblages from them would be expected to provide evidence of feasting activities, as seen in the number and kinds of ceramics present at each site.

Altiplano Period Settlement Patterns

Because two of the major fortified sites, Huichajaja and Llaquepa, are located outside of the survey boundary, the settlement data are only applicable for assessing the relationship between the two major fortified sites, Tanapaca and Pukara Juli, and several clusters of settlements near them. The settlement pattern within the Juli–Pomata intensive survey area during the Altiplano Period centers on major fortified and temporary refuge sites. The survey results indicate that major fortified sites are more or less centrally located between distinct population clusters, with some of

the individual population clusters, in turn, being located near refuge sites.

One of these clusters is made up of sites in the vicinity of Suankata, a minor refuge site. It includes several sites in the northern portion of the survey zone, the largest of which are sites 448 and 445. Sites within this cluster are located in and along the periphery of the Moyopampa plain and extend in a linear pattern toward a cluster of sites below the major fortified site of Pukara Juli. It is within the vicinity of Pukara Juli that several discrete clusters of sites are apparent. These clusters include sites in the Moyopampa area, as previously mentioned, and sites associated with the two refuge sites, Zapacollo and San Bartolomé.

Another cluster of sites is located approximately 10 km to the south of the Pukara Juli group in the Sihuayro area. This cluster contains a center (site 287), other large villages, and several hamlets. Sites within this cluster are not far from the major fortified site, Tanapaca. Two other clusters are located in the areas on either side of the Pomata area, containing villages (sites 384, 393, and 428, among others) and several hamlets. On the north side of the Pomata area cluster, located near the lake edge, is the refuge site, Tocokcahua (418). Site 388, a large village, although not clearly a fortified or refuge site, is located on the top of a high promontory between site 418 and the major fortified site, Tanapaca.

These settlement data indicate the presence of several discrete population blocks, some associated with refuge sites and others associated with major fortified sites. Significant in these data is the central location of major fortified sites between different site clusters. For example, Tanapaca is centrally located between the Pomata and Sihuayro clusters, and Pukara Juli is situated between the San Bartolomé and Zapacollo clusters and, to a lesser extent, the Moyopampa settlement group.

The association between different settlement groups with centrally located major fortified sites suggests the existence of distinct political units, one associated with Pukara Juli and the other with Tanapaca. The proposition that the survey region contains different political groups is supported by the comparison of site size distributions for sites within the Tanapaca and Pukara Juli settlement systems. In terms of size, each settlement system contains approximately equal proportions of site size categories. The only difference between the two settlement systems is that the Pukara Juli group contains many more smaller sites. Although

the distribution of nonfortified site sizes within each of these settlement groups describes a three-tiered hierarchy, it is not clear that differences in site sizes indicate a political hierarchy. Other than size, no architectural or artifact evidence was noted during the survey that would distinguish larger unfortified sites from smaller ones.

The settlement pattern within the Juli–Pomata region is complex. It shows the existence of several settlement clusters, possibly integrated within the political sphere of the major fortified sites. The identification of an uninhabited buffer zone between the Tanapaca and Pukara Juli settlement systems strengthens the interpretation that the settlements in the Juli–Pomata survey area represent at least two distinct political groups. These two groups were in turn made up of several separate communities. The ability to infer the degree to which these separate groups were politically integrated is complicated by the fact that some site clusters are associated with refuge sites. The association of some of the settlement clusters with minor fortified sites suggests that a level of political autonomy may have been maintained by local groups, even though they existed in proximity to major fortified sites. Within the category of large unfortified sites, there is no site that is comparably larger than others throughout the survey region, suggesting that major fortified sites were local centers of political power.

Additional evidence supporting the interpretation that major fortified sites were political centers of a two-tiered political hierarchy is the distribution of decorated ceramics between them. Pukara Juli and Tanapaca are the largest sites in the region and contain nearly all examples of decorated ceramics. In fact, only 15 decorated Pucarani ceramics were found in all nonfortified and temporary refuge sites combined, indicating that decorated ceramics had a distribution restricted to major fortified sites.

Architectural Features at the Four Major Fortified Sites

As discussed above, one set of archaeological correlates associated with defining simple or complex chiefdom political organization depends on a comparison of architectural styles and spatial patterning at separate major fortified sites. As we discuss below, the major fortified sites, rather than being characterized by similar patterns of spatial

organization and comparable architectural styles, each have different architectural styles and site layouts.

Huichajaja

The major fortified site, Huichajaja, is located near the modern town of Yunguyu and was visited and described by Hyslop (1976, p. 307). The habitation area of the site falls between 4350 and 4500 m.a.s.l. and is encircled by three main walls enclosing approximately 2 ha of habitation (approximately 100 structures) within an overall area of approximately 5 ha. Site walls measure from 1 to 2 m in width, reaching heights of over 3 m in some places. The first wall on the eastern face of the site describes a Z pattern and represents a distinct architectural feature at major fortified sites (Hyslop, 1976, p. 308). Site containment walls are backfilled with dirt, leaving a walled section extending above the ground level, creating a parapet. Narrower at their bases and flaring slightly to a wider dimension at the top, three sets of doors in each of the three main walls, between 1.5 and 2 m in width, permit access to the different sections of the site. Most doorways have connecting walls leading into the interior of the site and may have served to funnel traffic into the site.

The domestic architecture at the site consists of circular and ovoid structures measuring 2.5 to 3.5 m in exterior diameter. Circular and ovoid structure foundations are associated with three distinct architectural features: structures located near patios (circular raised platforms), structures enclosed in walled compounds, or structures located on terraces. Of the approximately 100 structures at the site, 42 were measured. Although interior floor areas of the measured structures range from 1.2 to 13.9 m², the majority of the areas sampled were small, 78.5% having interior floor areas of less than 5.0 m² (Table 9). Structures measuring less than 5.0 m² had a mean size of 3.2 m² (Table 10).

Rather than defining the presence of rigid, well-defined structure size categories within the site, the distribution of interior floor area was characterized by fairly continuous variation. The only apparent pattern might be described by a division of structure sizes into small and medium types, or structures less or more than 5 m². There was no apparent correlation between the size of a structure and its association with either patios, compounds, or terraces.

The most obvious spatial division at the site is

TABLE 9. Interior structure floor areas for all major fortified sites (m²).*

Parameter	Huicha- jaja	Lla- quepa	Tana- paca	Pukara Juli
No. of cases	42	48	34	23
Minimum	1.27	1.53	1.34	0.70
Maximum	13.96	31.65	32.42	46.18
Range	12.69	30.12	31.08	45.46
Mean	4.44	5.30	5.17	7.81
Variance	7.24	21.35	36.19	131.18
Standard deviation	2.69	4.62	6.01	11.45

* Total observations: 147.

defined by the fortification walls. Structures, patios, and enclosures are located in the areas between the site walls, but slightly more structures and architectural features occur above the third major wall. The eastern side of the site contains many large terraced constructions, although no structures and very few artifacts were found in this area of the site. Along this eastern flank, terraces are found downslope but do not reach the lowermost wall. Delimited by a fourth, much smaller wall, the highest area at the site is separated from the main habitation area and contains a number of circular and ovoid patio areas outlined by small walls. This area of the site contained a high percentage of decorated ceramics but almost no structures or foundations. The highest area at the site has a walled enclosure housing a modern shrine.

Other than the basic division of space determined by the enclosure walls, there is no clear internal pattern within the site, and the overall settlement density at Huichajaja is low. Although different kinds of architectural constructions are found within Huichajaja—compounds, patios, and terraces—the distribution of artifacts throughout the site is uniform, suggesting that different forms of architecture were not associated either with specialized activity areas or with clearly defined high-status residences. The highest area at the site is an exception, for it contained a high percentage of decorated ceramics, suggesting that it may have been used for ceremonial purposes.

Llaquepa

Also first reported by Hyslop (1976, p. 300), the major fortified site of Llaquepa is located approximately 10 km southeast of the modern town of Pomata. The estimated habitation area of the

TABLE 10. Interior structure floor areas of less than 5 m² for all major fortified sites (m²).*

Parameter	Huicha- jaja	Lla- quepa	Tana- paca	Pukara Juli
No. of cases	33	30	28	16
Minimum	1.27	1.53	1.34	0.72
Maximum	4.91	4.96	4.86	4.23
Range	3.64	3.43	3.52	3.51
Mean	3.27	3.29	3.25	2.75
Variance	0.82	0.96	0.56	1.17
Standard deviation	0.90	0.98	0.77	1.08

* Total observations: 107.

site is 8–10 ha, containing approximately 600–700 structures within an overall enclosed area of over 50 ha. As mentioned earlier, approximately 1 ha of the site was mapped. Three large walls encircle the site, making use of natural topographical features to approximately enclose its area. Site containment walls are similar to those seen at Huichajaja. The interior surfaces of the walls are filled in with dirt, and the lowermost wall on the northeast slope describes a Z pattern. Site entrance doors show slight variation and are either straight-sided or have narrow bases flaring to wider tops.

As at Huichajaja, structures are associated with distinct architectural features: they are found in walled compounds, or are located at the end of or within curved terraces, or surround open “plaza” spaces, or are found in clusters, or are isolated. The most characteristic spatial patterning is the clustering of three to five circular or ovoid structures, roughly the same size or with larger ones, throughout the upper reaches of the site. No patio units comparable to the ones at Huichajaja were observed at Llaquepa. Of 48 sampled structures, interior floor area ranged from 1.5 to 31.6 m², and whereas the largest structures measured between 5.0 and 6.0 m in diameter, the majority (62.5%) measured less than 5 m² in interior floor area (Table 9). Of the structures that had interior floor areas of less than 5.0 m², the mean size was 3.2 m².

Although the interior floor area data do not indicate the presence of well-defined structure size categories, three basic structure types are apparent. The first structure type measures between 2.0 and 3.0 m in exterior diameter. It is constructed with fieldstone foundations set into the ground. Stones are sometimes piled up on the foundations to form a structure very similar in shape to those that Hyslop (1977) called “igloo chulpas,” al-

though there is as yet no evidence to suggest that they were used for burials.

The second structure type is much larger than the first. Constructed in the same manner, these structures are impressive in size and are generally ovoid in shape, measuring 3.0 to 3.5 m wide and up to 5.0 m long. The third structure type is nearly circular and uncovered, measuring over 5.0 m in diameter. An exception to these three structure types was a single, nearly square construction containing 0.75×0.50 m cut door stones with bas-relief camelids carved on their exterior surfaces. This type of structure adornment has never been identified at an Altiplano Period fortified site and is suggestive of differential labor investment in structure construction.

The spatial division of Llaquepa is determined by natural features and site containment walls, and by the placement of structures throughout the site. The areas between each of the three main walls contain covered structures and structure foundations. The largest structures are sometimes found isolated at the highest part of the site. More often, though, they are surrounded by smaller structures or are associated with open plaza spaces. The Llaquepa site shows a more clear structure size ranking, a high settlement density, and evidence of status differentiation in structure adornment. However, the placement of structures within the site does not conform to an overall plan. That is, rather than being spatially segregated, the largest structures are consistently surrounded by several smaller ones and occur in different areas of the site. A more extensive systematic surface collection will be necessary to determine whether the distribution of architecture and artifact types correlates with different activity areas.

Tanapaca

Tanapaca is the highest of all the studied major fortified sites. Located on top of a very steep-sided hill, the habitation area reaches almost 4600 m.a.s.l. Several concentric walls encircle an area of approximately 15 ha, including 5 ha of habitation area.

Two types of doorway permit entrance into the site habitation area. The first type of doorway is covered and inset, built into the fortification walls and measuring 1.0 m wide by 2.0 m high. Fortification walls with the inset doorways continue over the door, contain raised sections or built-in ramparts, and are associated with what appear to

be tower constructions. The second doorway type is similar to those seen at other sites; they are either straight-sided or flare outward at the top. Access into and through the site is restricted by several doorways and the short distances between major walls.

Structures at Tanapaca are circular or ovoid, as at the other *pukaras*. As at Llaquepa, covered structures are well-preserved and are similar in shape and construction technique to the "igloo"-shaped structures found there. Buildings are found clustered together in walled enclosures near the top of the site, while structure foundations with variable diameters are found throughout the site. The largest structures, measuring up to 5 m in exterior diameter, are circular constructions without roofs, straight-sided and well-built. Of the 34 sampled structures (out of a total of approximately 100 at the site), floor areas ranged between 1.34 and 32.43 m² (Table 9), but most areas sampled (82.35%) measured less than 5.0 m² in floor area. Structures with floor areas of less than 5.0 m² had a mean size of 3.25 m² (Table 10).

Spatial patterning at Tanapaca appears more consistent than at either Llaquepa or Huichajaja. Three large circular constructions with cut stone doors dominate different levels on the west side of the site and are surrounded by numerous smaller structures. A number of variable-sized structures are located along the top ridge of the site, below a well-defined plaza area. The antiquity of this plaza area is in question because it is associated with a modern shrine that is in use today. Areas above the first two walls on the north side of the site are delimited by natural rock outcrops, and smaller walls defining open spaces within these areas contain few structures. Settlement density at the site is low, with the number of preserved structures and foundations not exceeding 100. As at Llaquepa, larger structures are surrounded by smaller ones and, rather than being spatially segregated, they occur at different areas of the site. All areas of the site contained similar artifacts, with the exception of the highest area of the site, near the plaza area, which contained many decorated sherds.

Pukara Juli

Visited and described by Hyslop, the major fortified site of Pukara Juli is located approximately 4 km from the modern town of Juli (Hyslop, 1976, p. 315). It is the largest and most complex

of all of the Altiplano Period sites studied in the southern Titicaca Basin. Four concentric walls intersected by natural topographical barriers run a combined distance of over 25 km around the site. Ranging in height from 2.0 to 5.0 m, these walls encircle four spatially segregated habitation areas. All four habitation areas are located between an altitude of 4100 and 4250 m.a.s.l. The combined habitation areas are estimated at 15 ha, containing approximately 400 structures within an overall enclosed area of nearly 75 ha. Three main walls run across the Yacari–Tuntachawi habitation area (4.0 ha), closing out at a rock outcrop to the south and continuing around the site to the north. Walls are built with two rubble-filled retaining walls such that the upper retaining wall is slightly lower in height than the downhill wall, forming a rampart. The site is further divided by three passageways that run vertically up through the walls through three sets of doorways. These passageways effectively control access and traffic patterns into and through the habitation area. The highest area of Pukara Juli contains a plaza area, with a modern shrine in its center.

The domestic architecture at Pukara Juli consists of numerous rounded terrace walls associated with circular structures. Structures are located either in the middle of terraces or at their corners; or they are located in walled compounds; or, less often, they are clustered together. Structure diameters vary in size from 2.0 to 7.0 m, with interior floor areas ranging from 0.70 to 46.18 m² (Table 9). Although three structure sizes are apparent at Yacari–Tuntachawi, consistent with the pattern seen at the other major fortified sites, the majority of sampled structures (23 out of a total of 150) are small, with 74% of the floor areas measuring less than 5.0 m². The mean size of these very small structures is 2.75 m² (Table 10).

At Pukara Juli, several structures exhibit a unique shape and construction technique. The most common structure found at Pukara Juli is an ovoid structure built of fieldstones. Stones were placed initially to create nearly vertical walls, which were covered with a corbeled roof. Unlike the preserved structures at the other major fortified sites, those at Pukara Juli do not have domed roofs; instead, additional stones were placed to cover any curvature created by the roofing process. The exteriors of the buildings are vertical-sided and flat-roofed despite the corbeling. Buildings of this type usually fall into the medium structure size range, whereas structures in the smallest category have only stone foundations and

were not covered. Similar to the pattern seen at Llaquepa and Tanapaca, the largest circular structures at Pukara Juli are also not roofed, but unlike the pattern seen at those sites, large circular structures at Pukara Juli are located in the lower areas of the site. A more detailed discussion of basic household architecture at the site of Pukara Juli is presented by Edmundo de la Vega, the excavator of one terrace household unit (de la Vega, 1990). Despite its spatial and architectural complexity, Pukara Juli does not contain a high number of structures or foundations, and, given its overall size, the settlement density is quite low. Pukara Juli is characterized by a low settlement density, comparable to those of Huichajaja and Tanapaca, but unlike at the other major fortified sites, larger structures are restricted to specific areas within the site.

Although each of the major fortified sites contains similar architectural features, including fortification walls, similar ranges in building sizes, and what can be interpreted as small-scale plaza or ceremonial areas, differences in architecture styles and spatial organization between the major fortified sites are not consistent with the expected archaeological correlates of a politically centralized organization. The Z-wall construction and earthen ramparts are specific to both Llaquepa and Huichajaja, but Huichajaja does not contain any large circular structures and contains unique patio constructions that occur without structure foundations. Unlike any Altiplano Period fortified site that we visited, Llaquepa contained evidence of structure adornment: bas-relief camelids carved into the door stones of one of the larger structures. Llaquepa is also characterized by a relatively high settlement density, containing up to 700 structures. Tanapaca and Huichajaja each contain approximately 100 structures, and Pukara Juli has approximately 400 structures. Tanapaca also differs from the other sites because it contains the unique architectural features of covered doorways and tower constructions, but, like Pukara Juli, the site has wall ramparts.

Of the four major fortified sites studied, Pukara Juli is the largest and clearly the most complex in terms of architectural layout. What differentiates Pukara Juli from the other sites is a more formalized spatial organization, as seen in the four separate habitation areas and the horizontal and vertical divisions within Yacari–Tuntachawi that restrict access to different sectors of the habitation area.

With the possible exception of Pukara Juli, the

size and architectural layouts of the fortified sites studied do not indicate a high level of political complexity. It was expected that a similarity in architectural layouts for each of the major fortified sites might indicate whether the sites were internally complex and politically integrated. The observation that each of the four studied sites exhibits important differences in architectural features and spatial organization strengthens the interpretation that major fortified sites, rather than representing centers within a unified polity, were most likely centers of small-scale political groups.

Altiplano Period Ceramic Artifacts from Major Fortified sites

The ceramic analysis provides further insights into the nature of Lupaqa political integration during the Altiplano Period. In general terms, the ceramics from the major fortified sites are all included in the broadly defined Pukarani style (de la Vega, 1990). However, a comparison of the limited ceramic sample from the four major fortified sites of this study indicated that the decorated ceramics were locally produced and exhibit significant variation in shape, rim diameter, and decorative motifs within and between sites.

Huichajaja Ceramic Artifacts

The ceramic sample from four collection units at Huichajaja comprises only 147 sherds out of an overall ceramic sample of 216 sherds. Six paste types are identified from the collection at Huichajaja and are denoted as H1 through H6. On the basis of inclusions, pastes are grouped into three basic categories: coarse, medium, and fine. Paste types H1, H2, and H4 are coarse, H3 is medium/coarse, and H5 and H6 are fine-textured pastes. Coarse and medium/coarse pastes are used to produce different sizes of jars and unidentified containers. The distribution of jar and unclassified vessel diameters is bimodal, showing the presence of two basic categories, large and small. Coarse paste ceramics, sometimes slipped red or occurring with red rim slips, make up the majority of the sample and likely represent utilitarian wares whose function has not been determined. Type H4 paste ceramics are either slipped red on the exterior or contain a red rim slip. Based on initial

visual analysis, they may be represented at other major fortified sites.

Fine paste ceramics are rarely slipped and are used to produce decorated bowls whose rim diameters are characterized by continuous variation and range from 9.0 to 22.0 cm. Of the 44 decorated sherds, 86.0% contain black decorations, 0.4% contain red decorations, and 13.6% contain red and black decorations. One decorated ware appears only at this site; it is a small jar form with rims that flare out at the body. One polychrome ware was found at the site—a red-slipped sherd containing cream, black, and orange decorations. It is an exotic.

Llaquepa Ceramic Artifacts

The ceramic sample from Llaquepa is fairly large, consisting of 347 sherds out of an overall sample of 379 sherds from four collection units. Eight paste types were distinguished within the sample and are denoted L1 through L8. Sometimes slipped, undecorated coarse/medium wares were made from pastes L1, L3, L6, and L8. Types L5 and L7 are fine paste ceramics that are usually decorated. Medium and coarse wares dominate the assemblage. Diagnostic sherds are all poorly represented, but large handle fragments and jars and other unclassified containers were made with L5 and L7 pastes. The distribution of rim diameters within this class of ceramics may be bimodal, but a larger sample size is needed before such a pattern can be confirmed.

The sample of decorated fine paste ceramics is small, comprising only 36 sherds, and it is variable in terms of rim shape and decoration style. The majority of fine paste ceramics, 89.7% of the sample, are decorated with black designs; 5.2% of the sample occur with red decorations and 5.1% of the sample have red and black decorations. A full 44% of decorated sherds have a brown to red or orange-slipped surface. The range in rim diameters for bowls is continuous, ranging from 9 to 23 cm without any apparent clustering. Paste variability, stylistic diversity, and the wide range of rim diameters shown in the decorated ceramic assemblage argue against standardized production by ceramic specialists.

Tanapaca Ceramic Artifacts

The ceramic sample from three collection units at Tanapaca is 234 sherds, out of an overall sam-

ple of 289 sherds. Six paste types are distinguished within the sample and are denoted T1 through T6. T1 and T2 are coarse, T3 and T4 are medium/coarse, and T5 and T6. T1 and T2 are coarse, T3 and T4 are medium/coarse, and T5 and T6 are fine-textured pastes. Coarse and medium/coarse pastes were used to produce variable-sized jar forms, handle fragments, and unclassified containers. Rim diameters within this group of ceramics appear to be bimodal, with small varieties measuring from 7 to 15 cm and large ones measuring from 26 to 40 cm. The majority of diagnostic coarse paste sherds are slipped on the exterior with either a light brown or red slip, and they occasionally occur with interior red rim slips.

Fine paste ceramics contain a number of design elements and rim shapes that appear more standardized than the samples from Huichajaja or Llaquepa. Nearly all of the 49 decorated sherds are bowl forms. Of these, 89.5% contain black decorations, 6.2% have red decorations, and 4.1% have both red and black decorations. Characterized by continuous variation, bowl form rim diameters range from 9 to 22 cm.

Pukara Juli Ceramic Artifacts

The ceramic analysis at Yacari-Tuntachawi is the most detailed for any Altiplano Period site in the Titicaca Basin, reflecting the excellent work of Edmundo de la Vega (1990). The total ceramic sample from the excavations is 2,482 sherds, of which 1,245 were analyzed. De la Vega identified seven paste types from Pukara Juli. Pastes P1, P2, P3, P4, and P7 are coarse; pastes P5 and P6 are finer. Coarse paste types were used to produce pitchers, pots, jars, decorated bowls, and plates. Several pastes were used in the production of small jars and bowls. Unlike the findings from other major fortified sites, rim diameters of jars and other containers fall into three broadly defined categories: a small category that ranges from 6 to 17 cm, an intermediate category that ranges from 20 to 26 cm, and a large category that ranges from 34 to 40 cm. The pattern in bowl rim diameters is also different at Pukara Juli. Bowl rim diameters are not as variable in comparison to ranges in rim diameters from the other sites, ranging from only 10 cm to 17 cm. Unlike the decorated sherds from other major fortified sites, which were manufactured with fine pastes, the majority of decorated sherds from Pukara Juli were made with coarse pastes. Also deviating

from the pattern seen at the other major fortified sites, of the total sample of decorated sherds at Pukara Juli, only 33.3% have black decorations, 11.2% are decorated with both red and black designs, and, significantly, 55.5% are painted with red decorations.

Discussion

The available data on settlement patterns, architectural features, and decorated ceramics do not support the model that populations associated with Altiplano Period major fortified sites were politically integrated, complex societies. Instead, these data support the interpretation that the Altiplano Period Lupaqa represent several small-scale political groups, most likely organized at the level of what evolutionary anthropologists have referred to as simple chiefdoms.

The Altiplano Period settlement pattern is characterized by discrete clusters of habitations located near both minor and major fortified sites, a pattern that includes buffer zones between population clusters. Although the settlement pattern analysis shows that unfortified, refuge, and major fortified sites form a three-tiered site size hierarchy, there is no other archaeological evidence, other than size, that unfortified and refuge sites were politically ranked. Instead, the observation that only 15 decorated sherds were found at the combined number of unfortified and temporary refuge sites, whereas 154 were found at major fortified sites, argues that major fortified sites occupied the highest level of a two-tiered political hierarchy. In addition, the central location of major fortified sites between discrete population clusters argues that they were the focus of political systems that succeeded in unifying several different communities in their immediate areas.

Rather than being characterized by complex and similar spatial layouts, as was anticipated had important sites been integrated into a unified political system, each of the four major fortified sites is characterized by a lack of specialized architectural forms, activity areas, and segregated elite areas. Also, each major fortified site contains different architecture styles. Huichajaja has a fortification wall that describes a Z pattern. In this respect it is similar to Llaquepa, but it does not contain the large circular structures seen at the other major fortified sites. Huichajaja does contain unique terraced patio constructions. The spatial

organization of Llaquepa is characterized by clusters of different-sized buildings, only one of which is adorned with bas-relief carvings, but like other large buildings, this one is surrounded by smaller structures. As at Llaquepa, the spatial organization at Tanapaca consists of a repeated pattern of smaller buildings clustered around much larger ones, but unlike what was observed at other major fortified sites, Tanapaca has inset doorways associated with rampart and tower constructions. In comparison to the other major fortified sites of this study, Pukara Juli provides evidence of a more complex spatial layout, as seen in four separate habitation areas, one of which is internally organized by the placement of fortification walls and vertical passageways. As determined by the distribution of surface artifacts and the placement of architectural forms within each of the sites, the spatial patterning at all major fortified sites, with the possible exception of Pukara Juli, is characterized by a lack of clearly defined elite sectors or specialized activity areas.

Another possible indicator of a lack of organizational complexity at these major fortified sites is that structure sizes do not fall into discrete size categories. Instead, structure size increases incrementally, from small buildings to large ones, without any clear breaks. The continuous range in structure size might be explained if structures were used for different purposes, were used by families of different sizes, or were occupied by groups of different social status. Despite the difficulty in discerning clear structure size clusters, structures from major fortified sites can be grouped into small, medium, and large categories.

Although it is not yet clear what the function of the largest structures is, it is possible that they served as elite homes, a suggestion made by Hyslop (1976, p. 115). An interesting observation is that modern Aymara groups use similar structures for ritual activities at mountaintop ceremonies, suggesting that these structures may also have served this function prehistorically. Whatever the function of these structures, the fact that they are large, well built, and consistently have worked door stone implies that they were important.

The available evidence indicates that the medium-sized structures were most likely associated with domestic activities, including cooking and food processing, but they may also have been used to sleep in. One excavated medium-sized structure at Pukara Juli contained hearths, camelid bones, and ceramics (de la Vega, 1990, pp. 136–137). One medium-sized structure at Llaquepa

contains bas-relief carvings of camelids on its door stones, a good indicator that it was used by an individual with high status.

The interpretation of the function of the smallest structures remains problematic. It is possible that many of these small structures functioned as temporary shelters, but their sizes are much smaller than the known ranges of contemporaneous Late Intermediate Period dwellings in the Titicaca region (Wise, 1993, fig. 10), structures at similar fortified sites in other areas of Peru (Costin & Earle, 1989), or even Middle Archaic residences (Aldenderfer, 1993, p. 19). However, even if all of the buildings located within major fortified sites housed people, their numbers are far too few to have housed the populations represented in the numerous unfortified sites below them.

Edmundo de la Vega (1990, pp. 120–122) suggests that the smallest structures at Pukara Juli sites were used for food storage. He points out that the smallest structures there could have been the foundations of above-ground silo structures made from *titora* reeds, a suggestion supported with evidence from the excavation of one small structure within Yacari–Tuntachawi. The excavated structure yielded no artifacts, hearths, or other evidence that it was used as a kitchen, domicile or, other domestic activity. We add to this evidence the observation that the smallest structures at all major fortified sites consist only of foundations and are usually not roofed with stone. However, the ability to distinguish which of the smallest structures at Pukara Juli and the other major fortified sites may have been used as storage facilities is hampered by the fact that their size range overlaps with those of structures that de la Vega (1990) identifies as houses. If the smallest structures at major fortified sites functioned to store food, the fact that the majority of structures found within major fortified sites are small (those measuring less than 5.0 m² have a mean size of 3.1 m²) indicates that the control of storage facilities may have been an important part of the political structure at these sites.

If the smallest structures were used to store food, it is implied that the resident population at the sites was also quite small, consistent with the interpretation that a small group of elite individuals was associated with these sites. The distribution of decorated ceramics almost exclusively to major fortified sites also supports the interpretation that these sites were organized around the activities of elite segments of the population, who most likely used stored goods as the base of their

political power. Use of major fortified sites for the storage of agricultural products (de la Vega, 1990, p. 120) and to protect camelid herds (Hyslop, 1976, p. 133) does not negate their obvious function as refuge centers, but, importantly, it also suggests their political function as well.

It was expected that if the Altiplano Period Lupaca in the southern Titicaca Basin were organized at the level of a complex chiefdom, there would be evidence of centralization and possibly specialization in the production and distribution of high-status goods. I suggested that fine-ware ceramic production would reflect centralization and specialized production; distribution of fine-ware ceramics to different sites would indicate political and economic integration. The ceramic analysis showed that although each assemblage is characterized by some similarities, there is no evidence of centralized production at major fortified sites. Instead, each site is characterized by important variability.

The similarities that characterize the ceramic assemblages from the four major fortified sites include the use of slips, decorative designs, and the distribution of a single paste type. In broad terms, all of the major fortified sites contain coarse paste ceramics, some of which are slipped on the exterior or contain red rim slips. The use of some common decorations is similar between sites, notably the use of black curvilinear lines placed either parallel to or arranged diagonally from the rim, or the use of parallel diagonal or vertical lines. Another similarity is the presence of a nearly identical paste at each of the four major fortified sites. The observation that paste no. 4 at Huichajaja, Llaquepa, and Tanapaca and paste no. 3 at Pukara Juli all appear similar suggests that they may have been manufactured at the same place. A mechanism that could account for the distribution of a poorly made coarse paste ceramic to the major fortified sites remains to be determined. Rim diameters for the decorated ceramics from the major fortified sites are similar to those from Huichajaja, ranging from 8.0 to 23.0 cm (mean, 16.9 cm). Rim diameters of decorated ceramics at Llaquepa range from 10.0 to 22.0 cm, with a mean diameter of 15.0 cm. Tanapaca rim diameters on decorated sherds range from 7.0 to 21.0 cm, with a mean diameter of 17.1 cm.

Differences in the ceramic assemblages from the four major fortified sites are seen primarily in the paste types of decorated ceramics and in variations of vessel form and decoration style between individual sites. The clearest difference be-

tween the decorated ceramic assemblages from the major fortified sites is in paste composition. As noted previously, decorated ceramics from Huichajaja, Llaquepa, and Tanapaca are made with fine pastes, whereas those from Pukara Juli occur on coarse pastes. Fine paste ceramics from Huichajaja are characterized by the use of fine opaque to white inclusions and by the occasional use of red inclusions. Almost none of the decorated sherds were made with black inclusions, and the pastes are highly variable in terms of the density and distribution of inclusions. The two fine-ware pastes from Huichajaja range in Munsell soil color from 5YR 5/6 to 7.5YR 7/6 (H5) to 10R 5.5/0 to 2.5YR 5/7 (H6). The decorated sample from Llaquepa, in contrast, is characterized by a higher percentage of sherds being produced with white and red inclusions, although some black and occasional mica inclusions are present. Fine paste decorated sherds from Llaquepa range in color from 2.5YR 5/8 to 5YR 6/6-8 (L5) to 2.5YR 5/8 to 5YR 5/6 (L7). Additionally, almost half of the decorated sherds from Llaquepa occur with slipped surfaces, a pattern not seen at the other major fortified sites. The decorated ceramics from Tanapaca are also made from fine pastes. The majority of the sample includes pastes that contain only white and/or opaque inclusions, although some examples contain white and black inclusions. Fine pastes range in color from 2.5YR 5/8 to 5YR 6/6-8 (T5) and 2.5YR 5/8 to 5YR 6/6 (T6). Decorated sherds from Pukara Juli occur on coarse pastes that range in color from 10YR 2-6/4, 5YR 5/4 to 7.5YR 5/4 (de la Vega, 1990, Lamina-21,22).

The decorated assemblages from each of the major fortified sites are also different in respect to form and decoration style. For example, ceramics from Tanapaca are characterized by a unique jar form that occurs only at this site, decorated sherds from Llaquepa occur primarily on slipped surfaces, and the prevailing design motif at Pukara Juli has several horizontal red lines located parallel to bowl rims. As noted previously, the majority of decorated ceramics from Pukara Juli are painted with red designs, whereas those from Tanapaca, Huichajaja, and Llaquepa are characterized by the use of black decorations.

There is no evidence to suggest that decorated ceramics were produced in one locality and subsequently distributed to separate major fortified sites. Instead, several observations provide evidence that ceramics were produced within the localities of individual sites and without using clear

standards or specialized craft workers. The observation that the pastes used in ceramic production vary in number and composition between sites supports the interpretation that they were manufactured locally. Variation in decoration style, surface treatment, rim diameter range, and, to a lesser extent, form argue against standardization or specialization, even in local ceramic production. Finally, the poor overall quality of Pucarani ceramics does not suggest that any specialization characterized their production. Rather than supporting the model that the Lupaqa represent a unified political entity, the available ceramic data support the interpretation that the Lupaqa are more likely to have been several independent political groups, with each center producing its own decorated ceramics. Given the wide range of variability within and between sites, it is possible that decorated ceramics produced in each site were traded or otherwise distributed to other sites. However, there is no evidence that the distribution of decorated ceramics between sites took place under a well-organized or centralized political or economic system.

The ceramic data from the major fortified sites also provide evidence that they were the focus of political and or ceremonial activities: nearly all examples of Altiplano Period decorated ceramics are found within major fortified sites, and they are almost never found at other settlements. The distribution of decorated ceramics at major fortified sites suggests that elite people lived there or that ceremonial or political activities were carried out within them. Evidence that ritualized feasting took place at these sites comes from the analysis of the decorated ceramic sample and the ceramic forms made from coarse pastes. The fine paste ceramics are used primarily to produce decorated bowl forms, whereas coarse pastes are used in the production of small and large jars and large containers. It is tentatively suggested that the ceramic classes identified at the major fortified sites are associated with elite-sponsored ritual feasting or other ceremonies. Many of the smaller decorated bowls found at Huichajaja and at the other major fortified sites were most likely used as drinking vessels, whereas the larger containers and jars almost certainly held food. What is not clear is what function these ceremonies served. Did they serve as a mechanism to consolidate local power structures, or did they function as a means for establishing and maintaining political alliances with other political groups, or both?

The available data indicate that the Lupaqa

were organized into small-scale political groups that most likely competed with each other for political prestige. That the political groups were small-scale simple chiefdoms is seen in the fact that each major fortified site did not contain architectural patterns associated with well-organized economic activities and that the decorated ceramics were locally produced. The supposition that major fortified sites were in competition with each other is supported by the settlement data. The settlement data within the Juli-Pomata region indicate that the two major fortified sites there were centrally located between several unfortified and temporary refuge sites and that the settlement systems associated with these sites were separated by what was apparently a buffer zone. Competition between major fortified sites is further reflected in the fact that each site contains important differences in architectural styles.

The picture that emerges concerning the political landscape of Altiplano Period Lupaqa is of several small polities competing over political influence. The supposition that each site contains many structures that appear to have been related to storing foodstuffs indicates that local elites had control over community resources and derived their political influence by controlling these stored goods. The nature of the ceramic assemblage from the major fortified sites suggests that they were used in conjunction with feasting ceremonies that served to tie together the local population and provided a context for elites to demonstrate their political influence. The feasting ceremonies carried out within major fortified sites were most likely used by elites as a competitive mechanism for expanding the population base of each competing polity and may have served as an alliance-building mechanism that incorporated the elites of other major fortified sites as well. However, it is likely that periods of fierce competition created periods of alliance failure, followed by an outbreak of warfare. This pattern of competition and military conflict is one that is well documented within the Mantaro Valley in central Peru during the same time period (D'Altroy, 1994).

Although most of the evidence concerning Altiplano Period Lupaqa social organization points to the existence of several small and politically unintegrated groups, the Lupaqa were said to have fielded a unified fighting force on the arrival of the Inca into the Titicaca Basin. The fact that during critical military campaigns the separate polities within the Lupaqa territory were able to come together suggests that there existed some sort of

alliance network that enabled the populations under different major fortified sites to coalesce into a larger and more complex political organization. Nevertheless, there is no evidence from the major

fortified sites to suggest that the Lupaqa were integrated into a political system that produced the expected material correlates associated with a politically integrated society.

Ceramic Illustrations

The ceramic color key is shown in Figure 89, and the illustrations listed in the text are found in Figures 90–106.

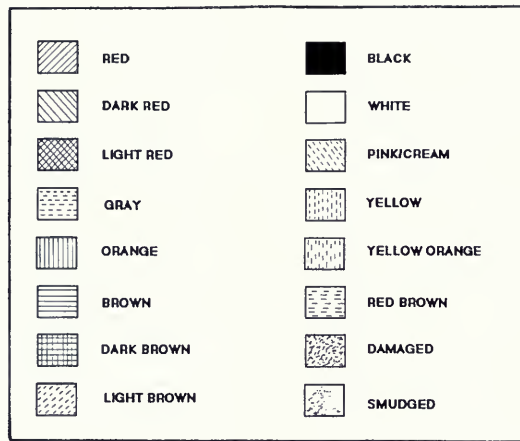


FIG. 89. Ceramic color key.

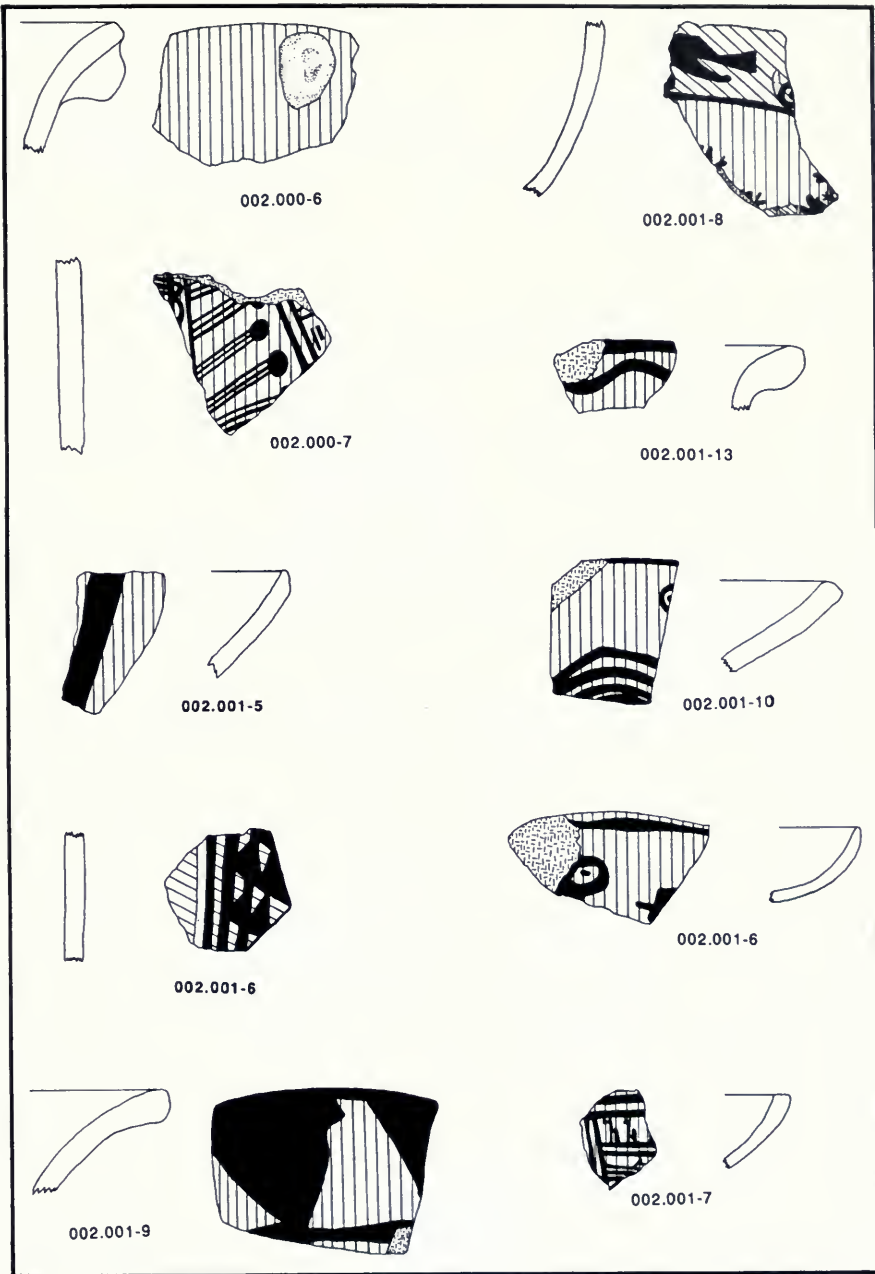


FIG. 90. Ceramic illustrations from survey sites.

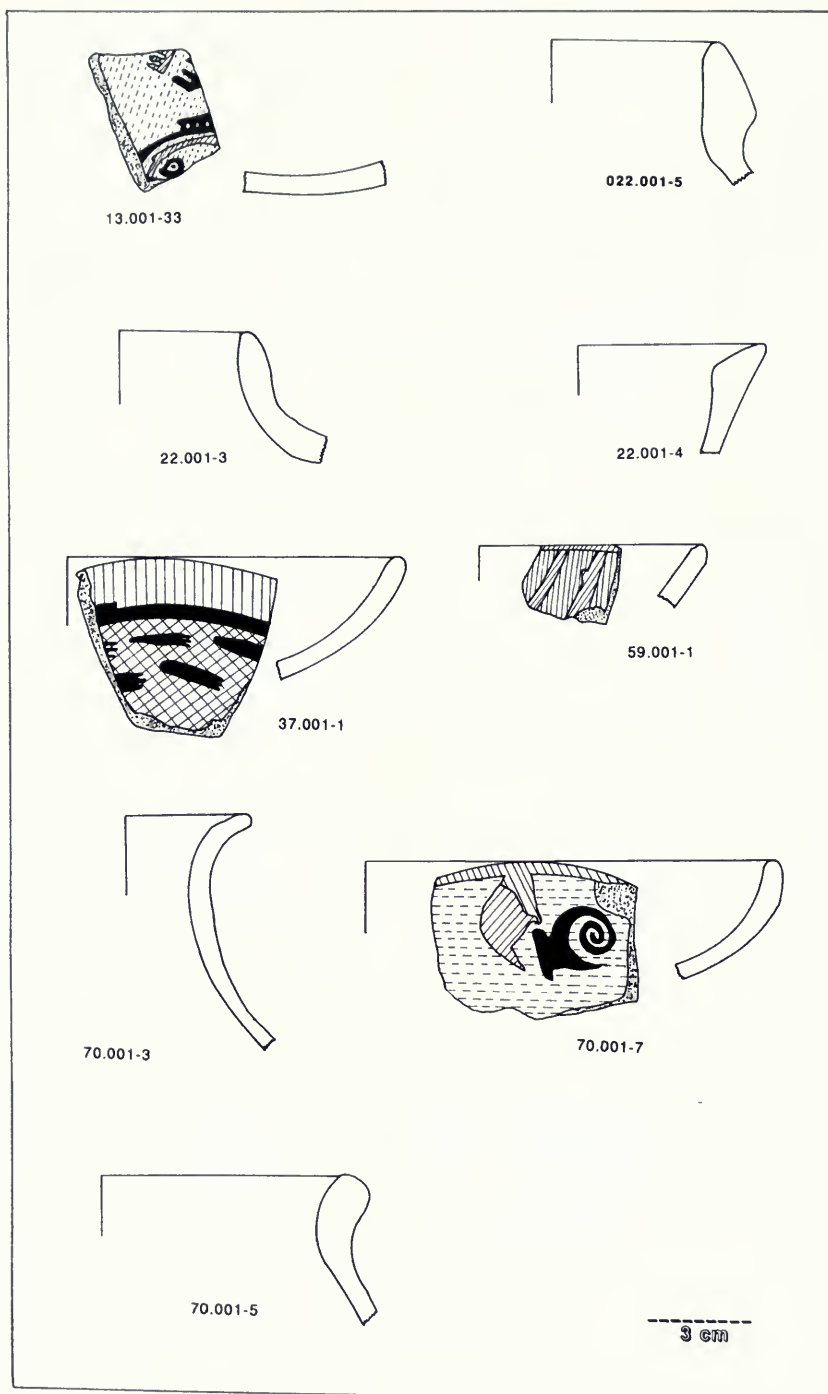


FIG. 91. Ceramic illustrations from survey sites.

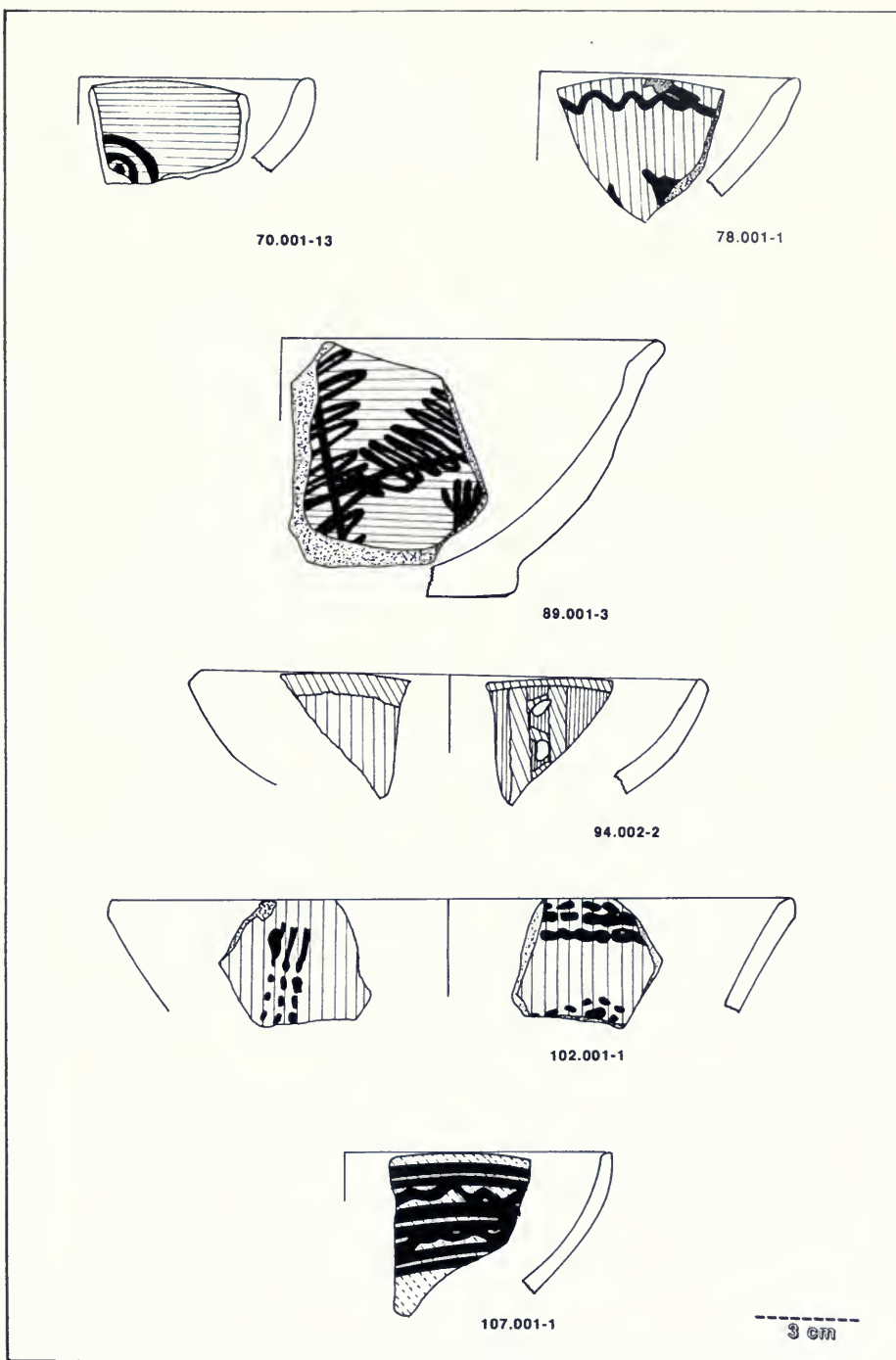


FIG. 92. Ceramic illustrations from survey sites.

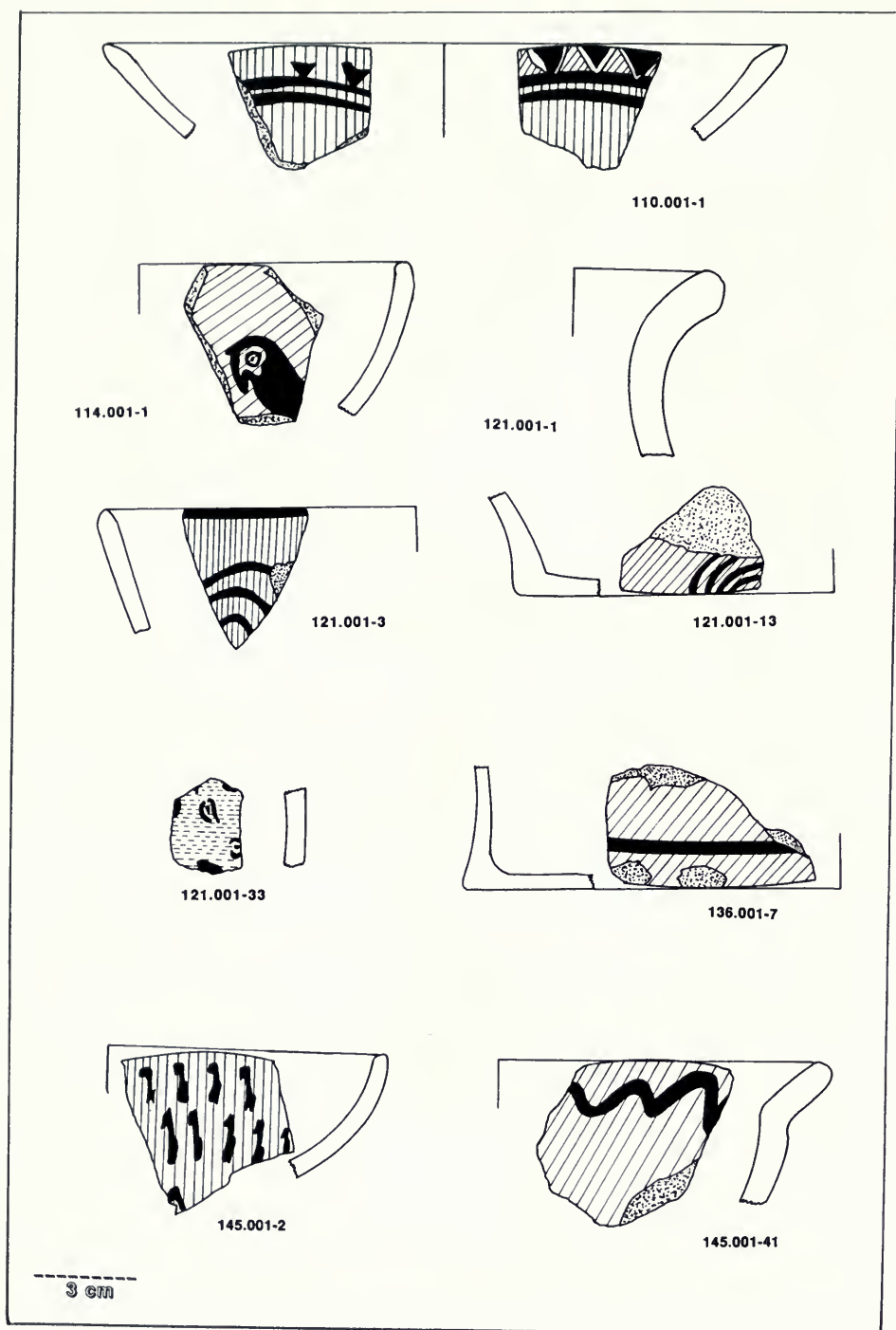


FIG. 93. Ceramic illustrations from survey sites.

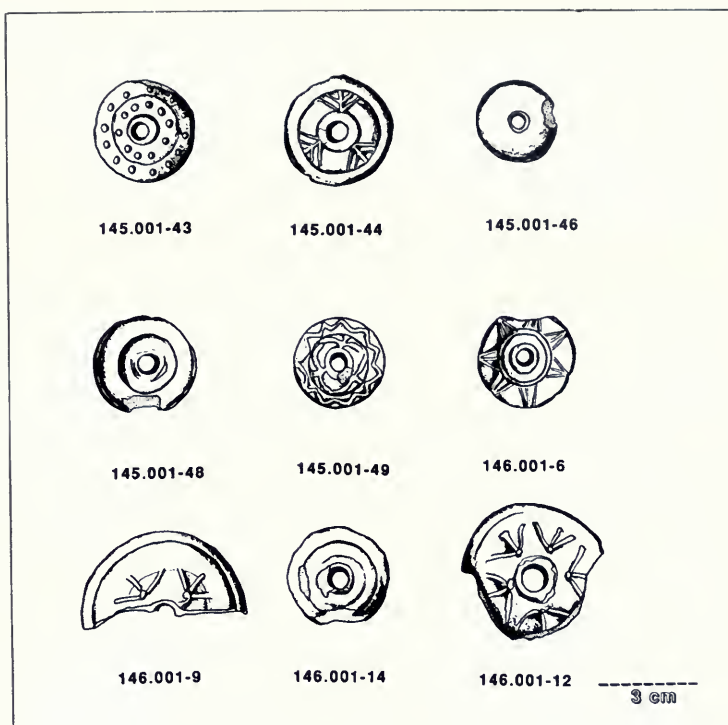


FIG. 94. Ceramic illustrations from survey sites.

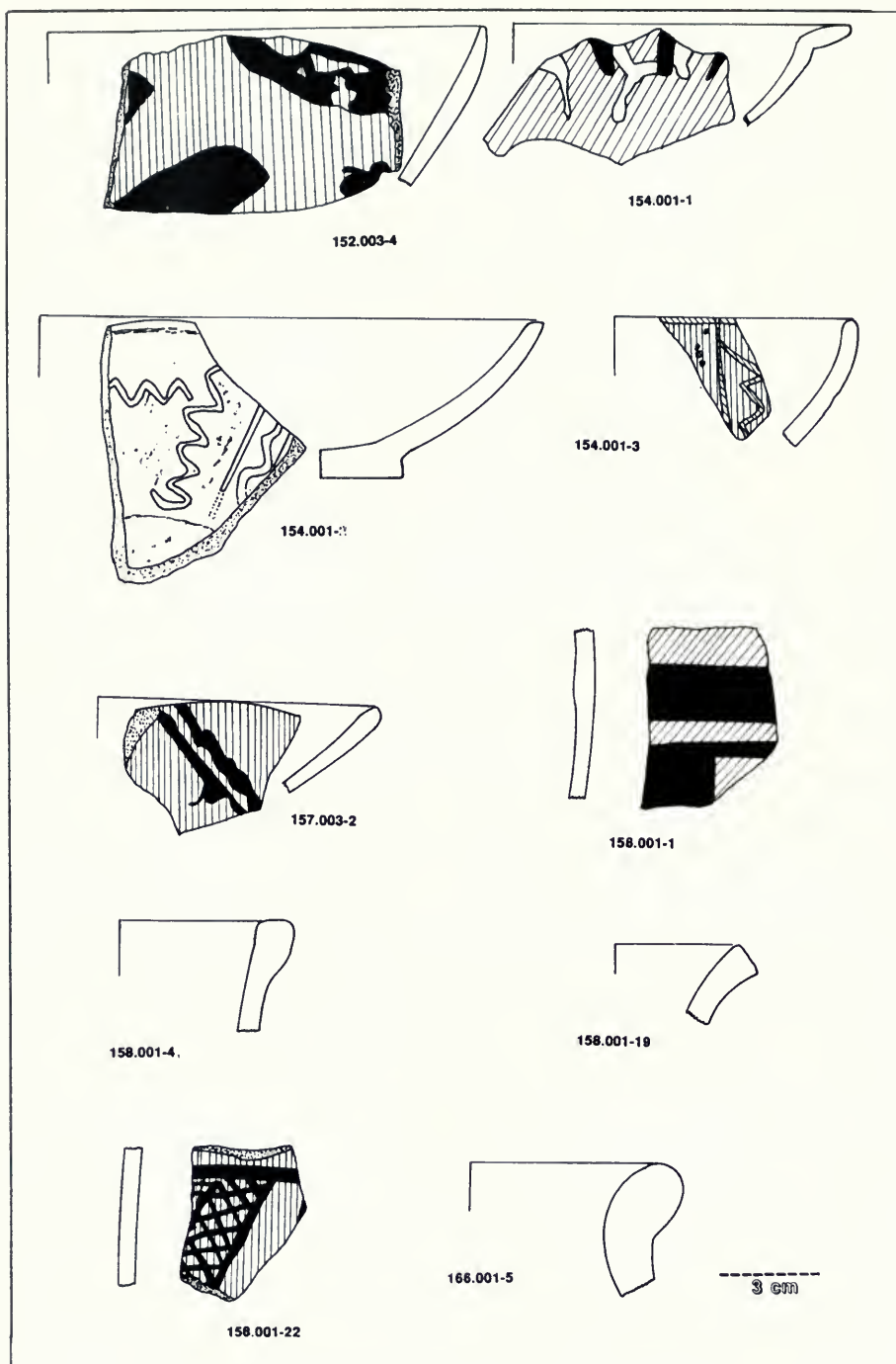


FIG. 95. Ceramic illustrations from survey sites.

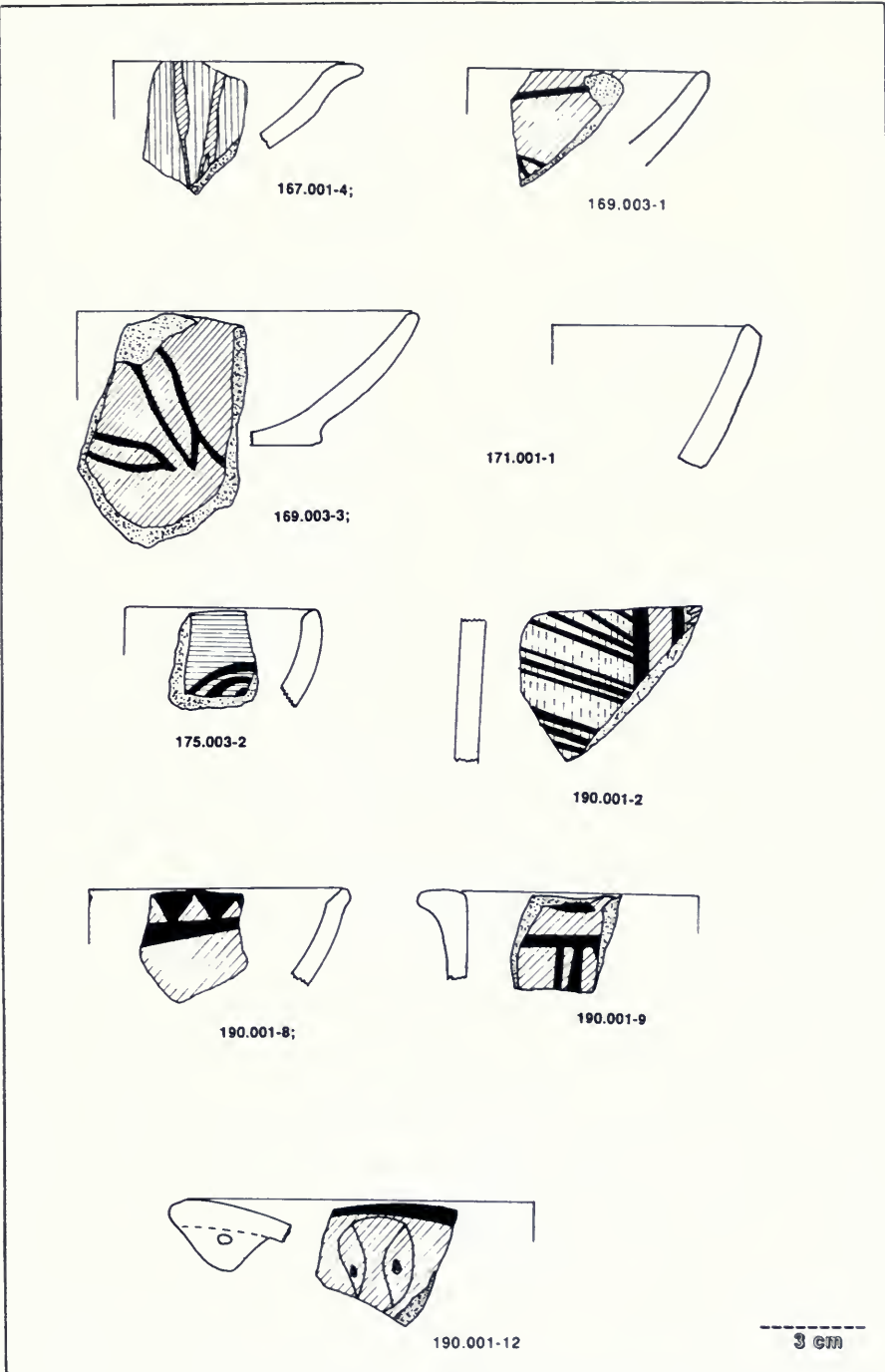


FIG. 96. Ceramic illustrations from survey sites.

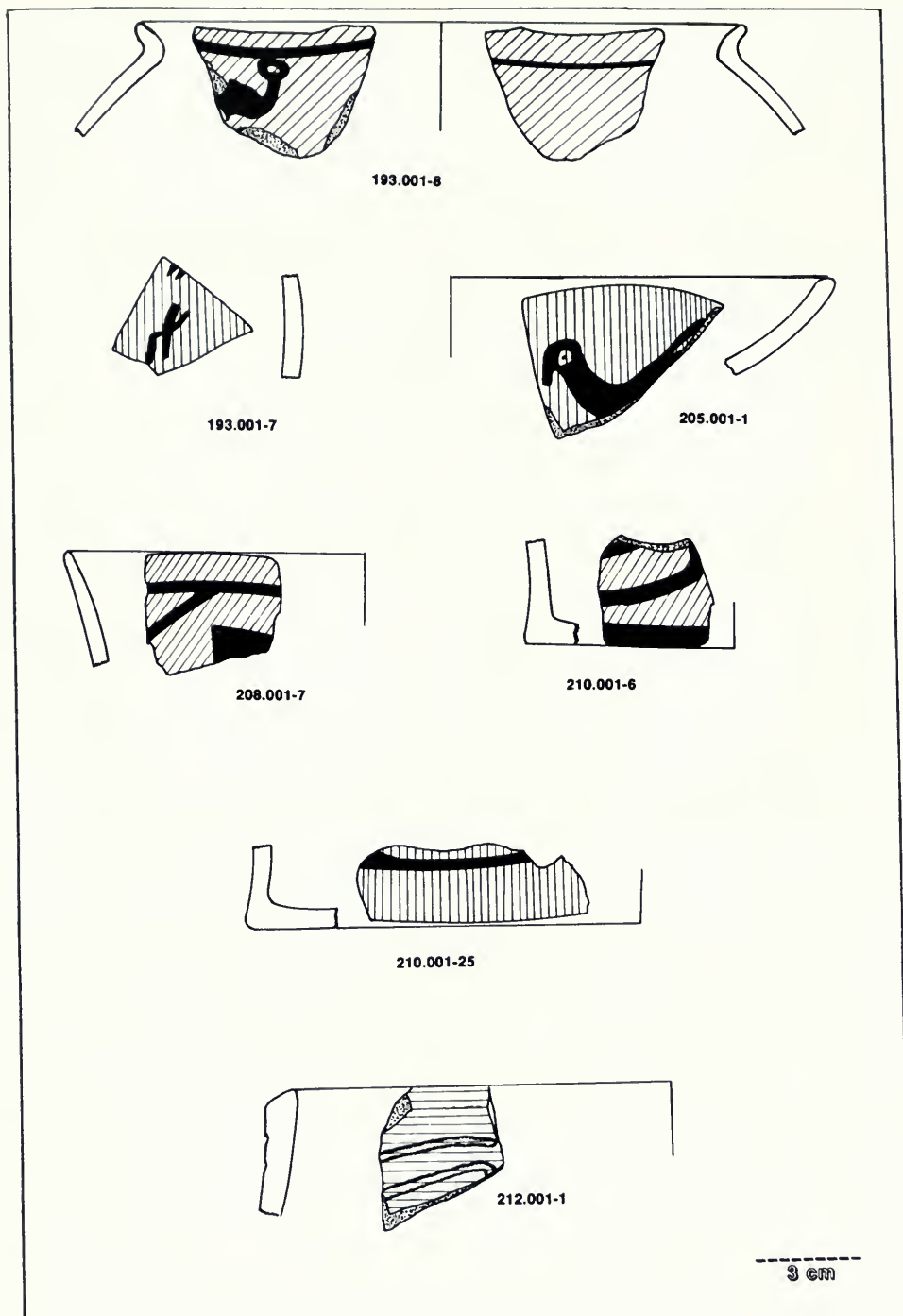


FIG. 97. Ceramic illustrations from survey sites.

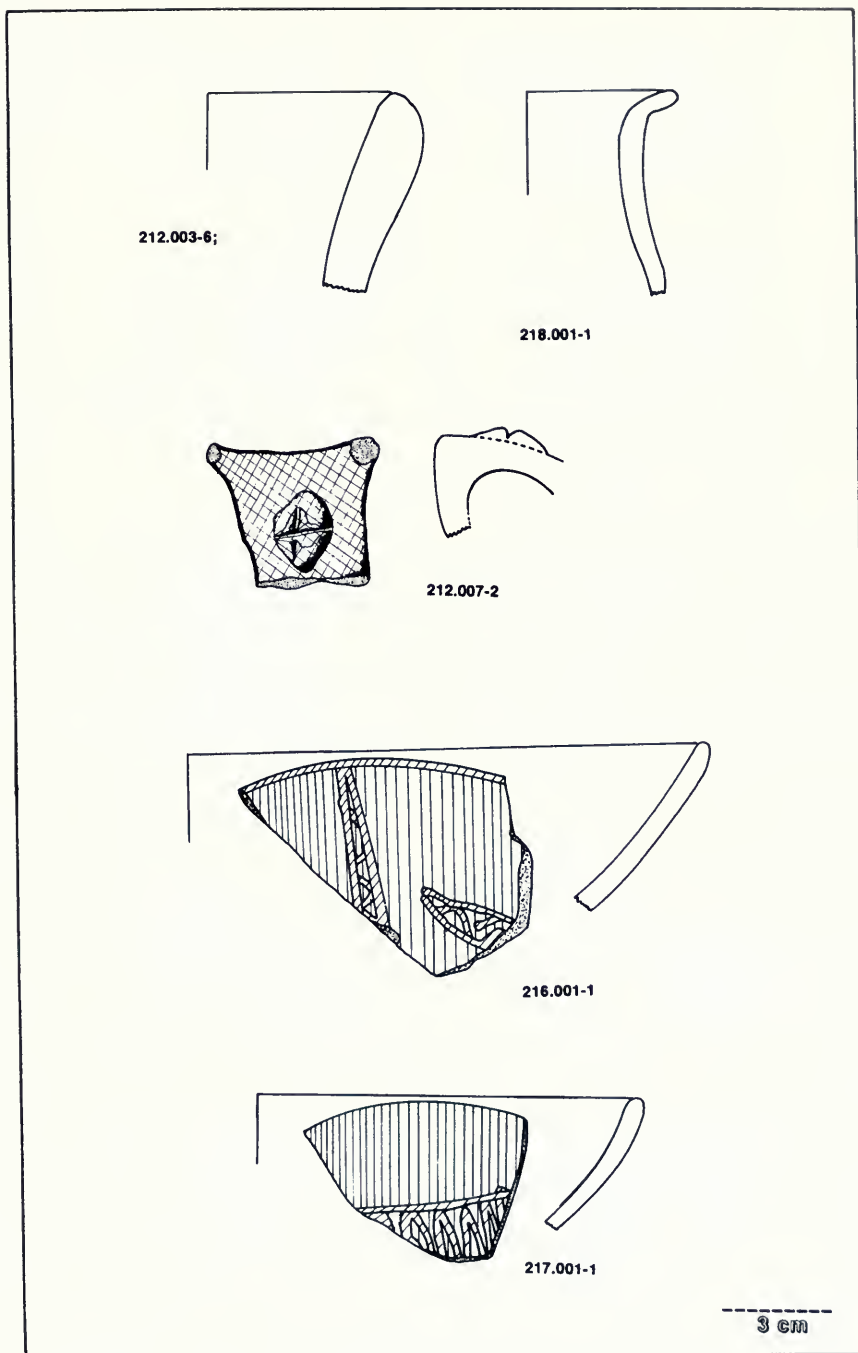


FIG. 98. Ceramic illustrations from survey sites.

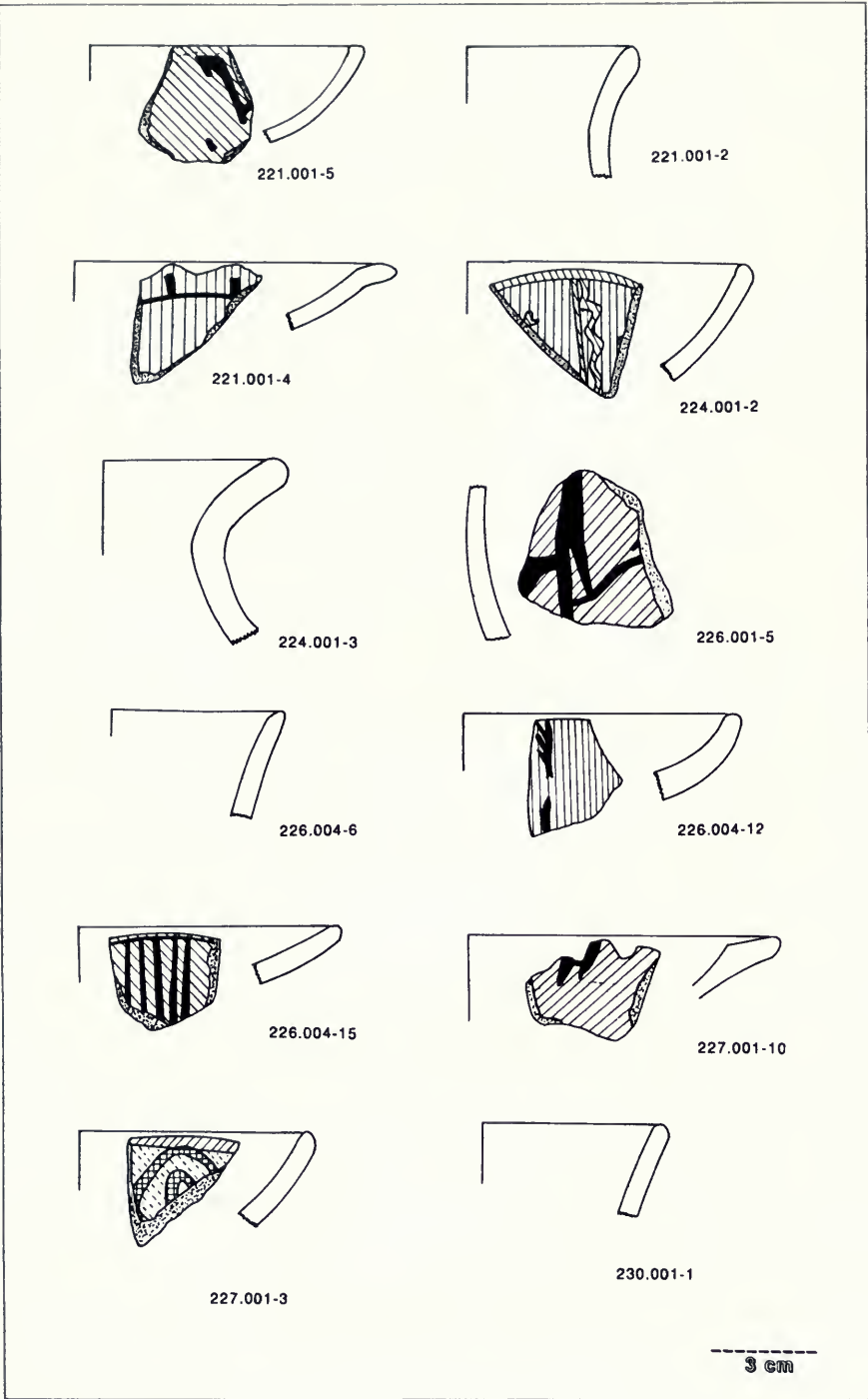


FIG. 99. Ceramic illustrations from survey sites.

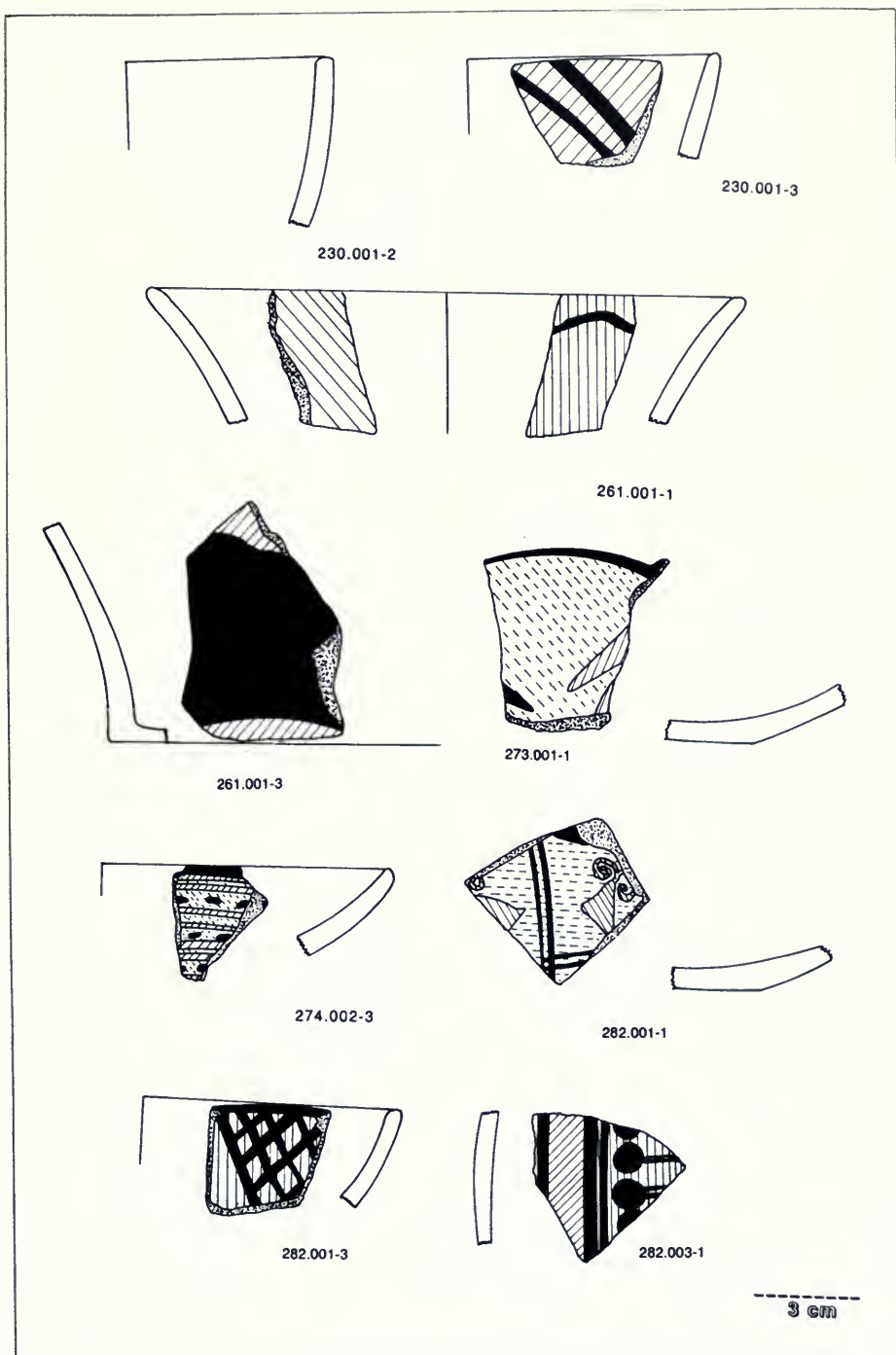


FIG. 100. Ceramic illustrations from survey sites.

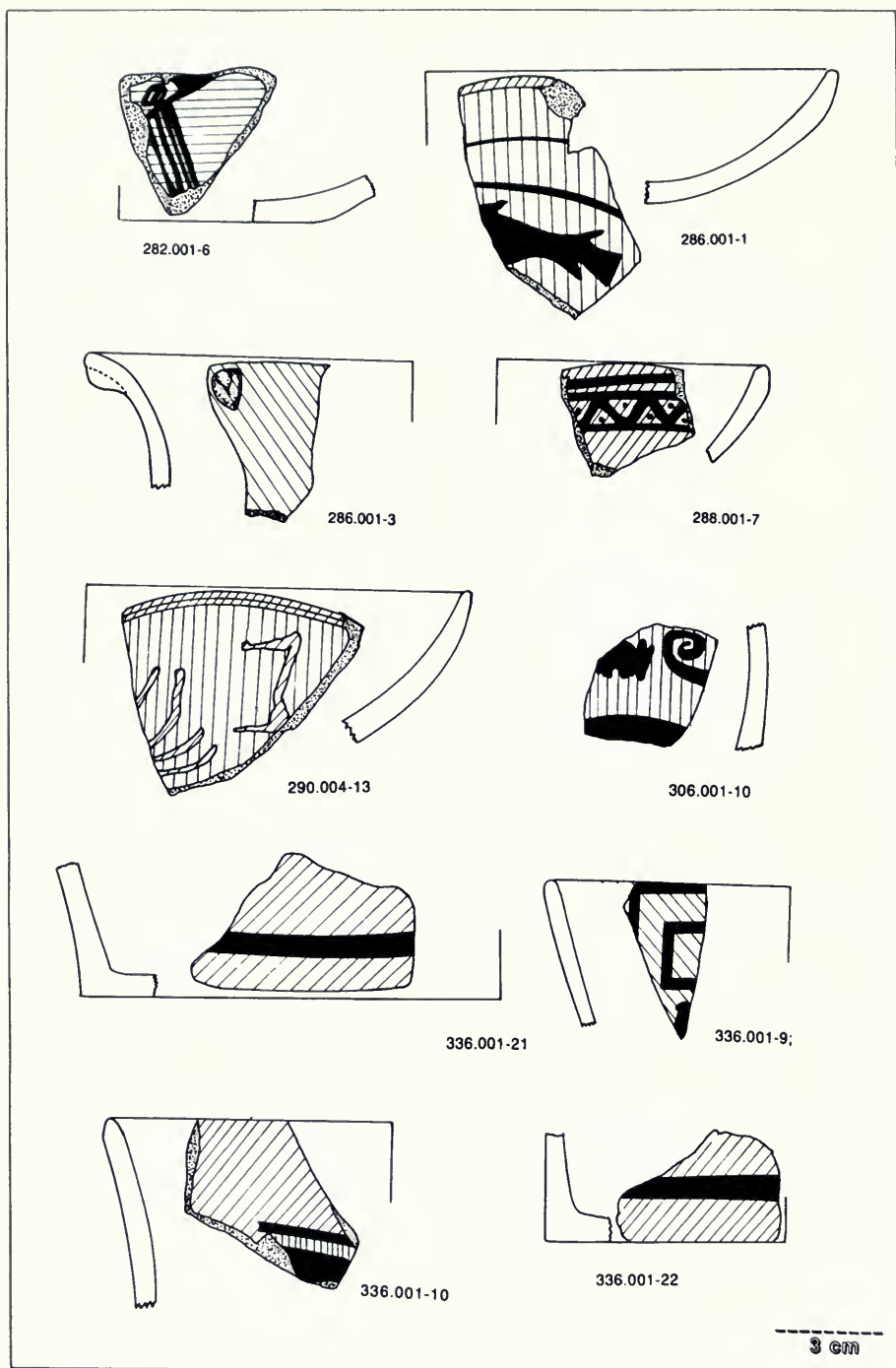


FIG. 101. Ceramic illustrations from survey sites.

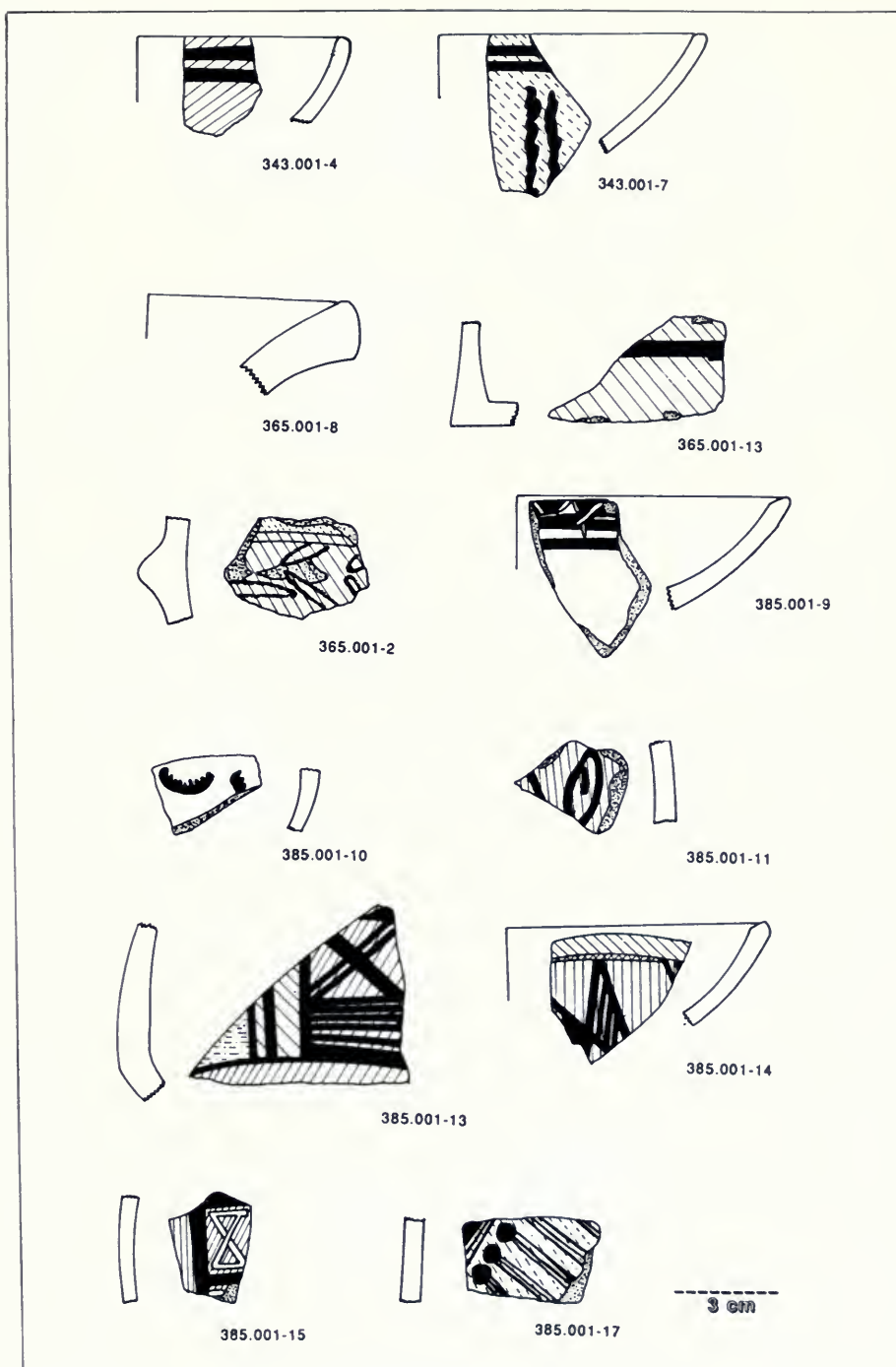


FIG. 102. Ceramic illustrations from survey sites.

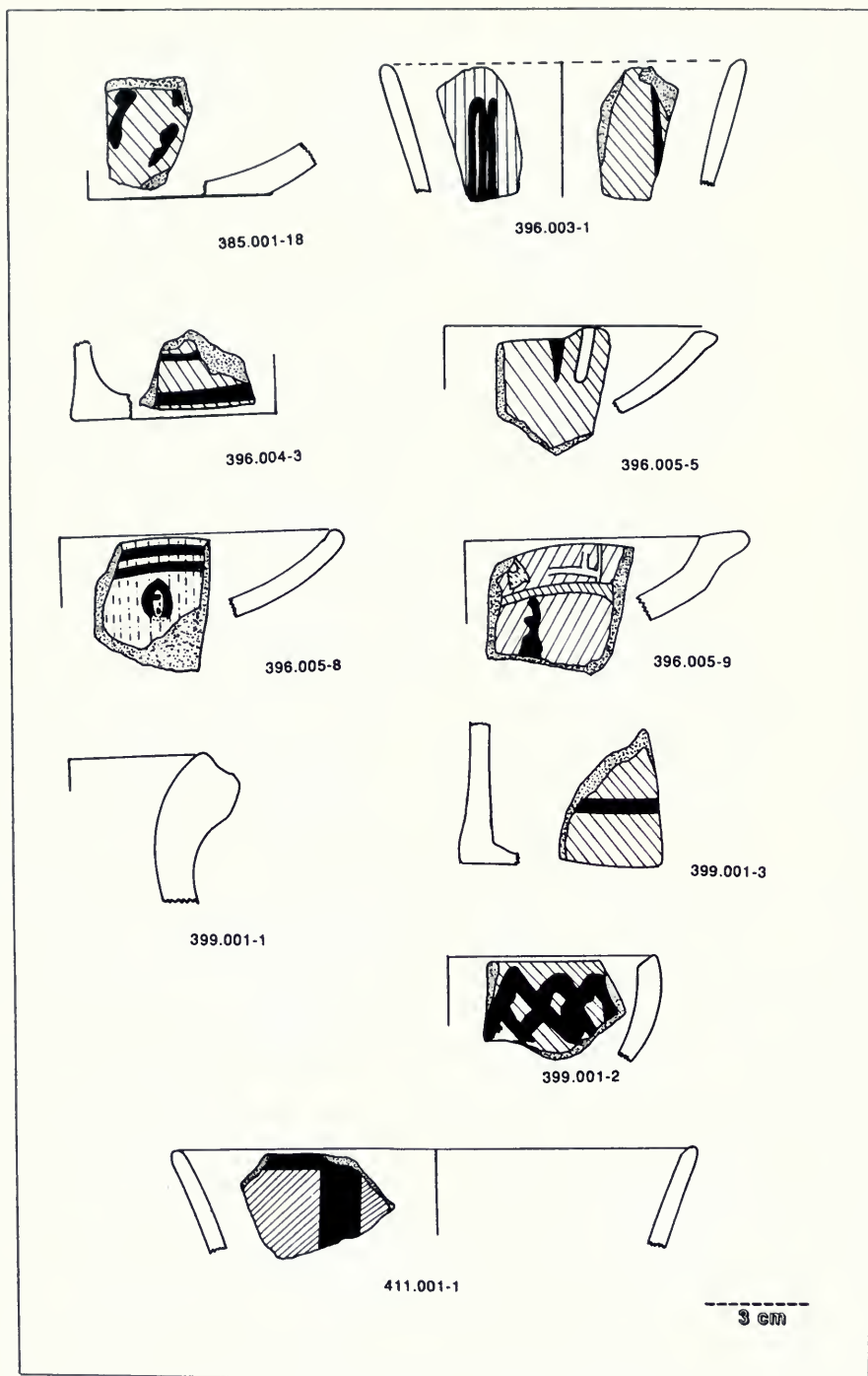


FIG. 103. Ceramic illustrations from survey sites.

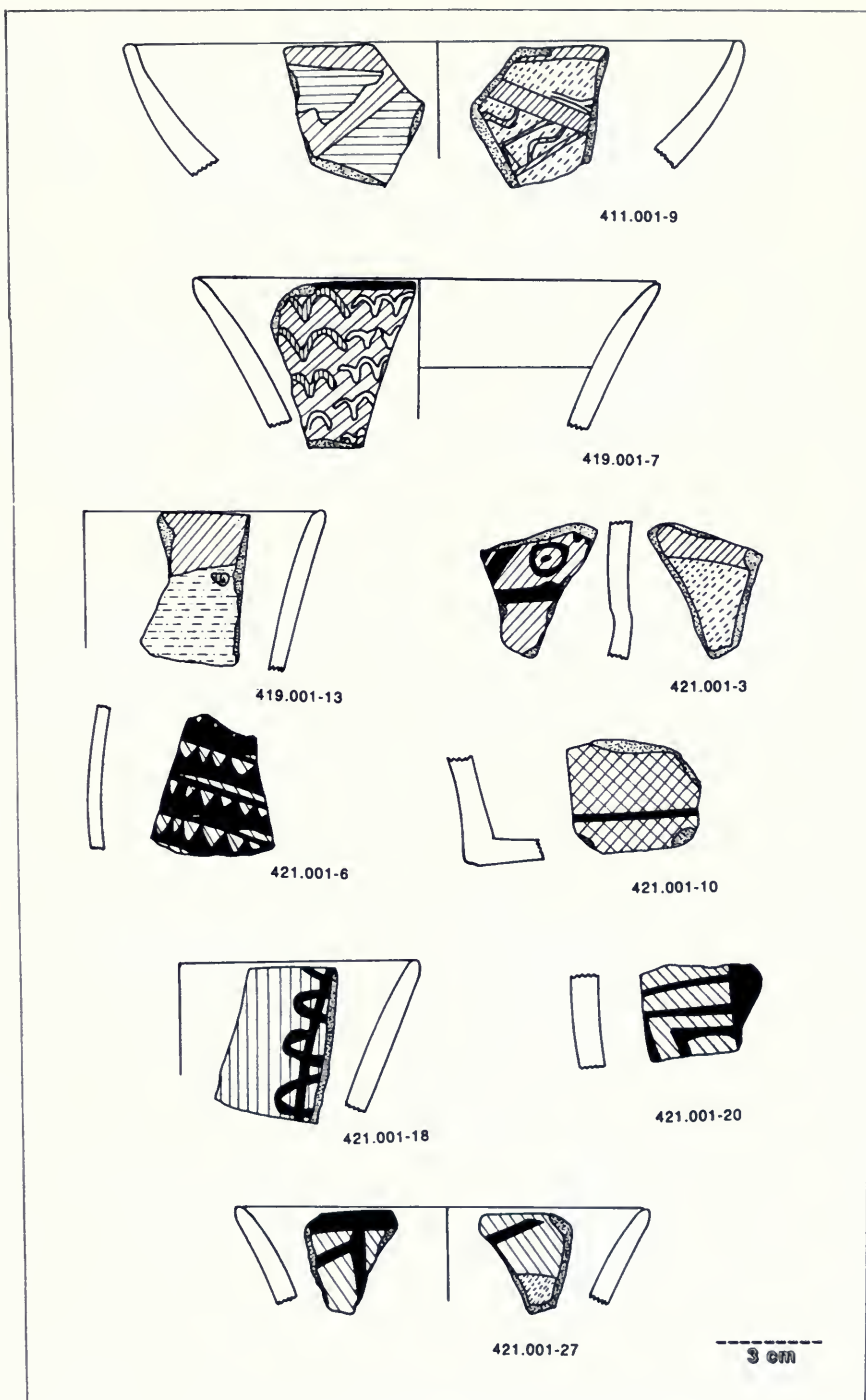


FIG. 104. Ceramic illustrations from survey sites.

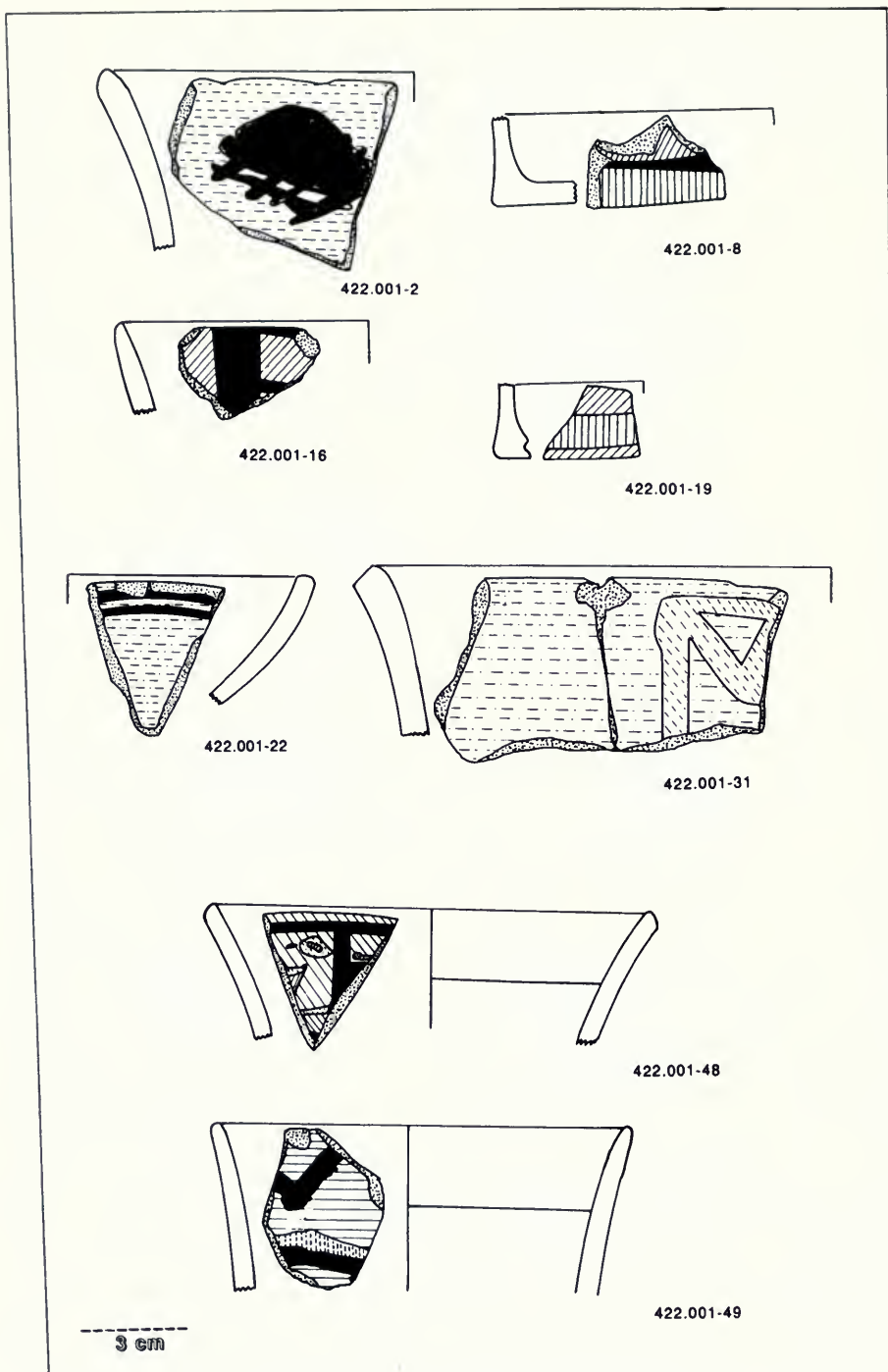


FIG. 105. Ceramic illustrations from survey sites.

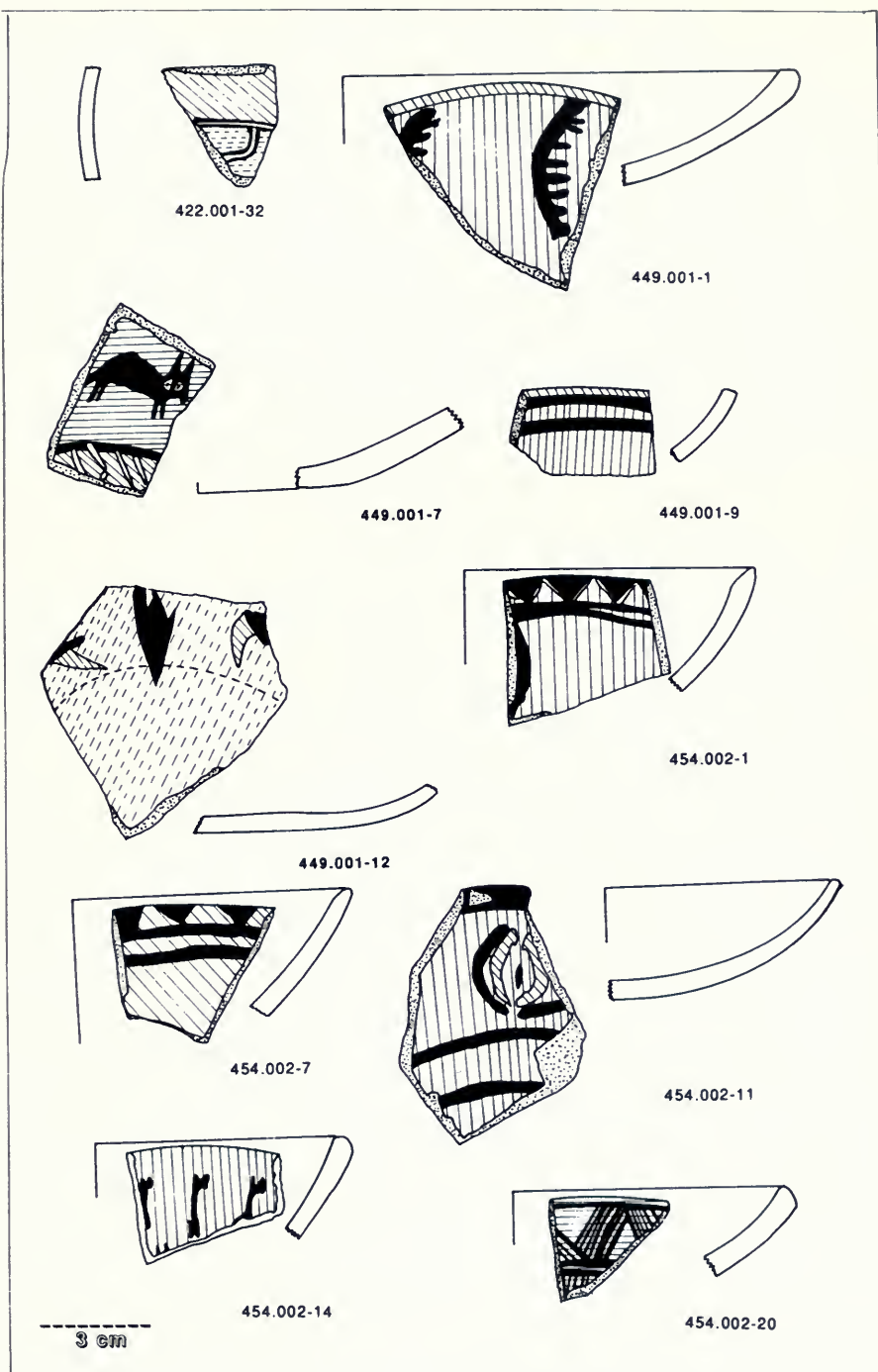


FIG. 106. Ceramic illustrations from survey sites.

The Survey Map Blocks

The map block key is found in Figure 107; it shows the location of each block relative to the other blocks. The lack of standardization in the available maps and some errors in the contour lines have created minor discrepancies between the adjacent blocks. The individual map blocks, and not the site size distribution maps, are the definitive site locations. The survey map blocks are listed as Figures 108–124. Each block represents a portion of the survey area. The sites are portrayed as accurately as possible using nongeometric shapes. The sizes of the sites generally correspond to the largest habitation site area for any particular phase, as listed in Table 1. However, in some cases there are non-overlapping areas of habitation refuse in different periods on a single site, so it is possible that the site area depicted on the map is actually larger than the largest site area listed for any single phase in Table 1. Cemeteries are usually indicated as a small dot because the purpose of the map blocks is to indicate total habitation areas. The topographical contour lines are drawn from 1:10,000 or 1:50,000 scale maps. Unfortunately, there is some inconsistency in the published contour lines, so we have left out absolute elevations. The lake level is 3810 m above sea level. The contour lines in all map blocks except J and N represent 25 m. Those in J and N are 50 m.

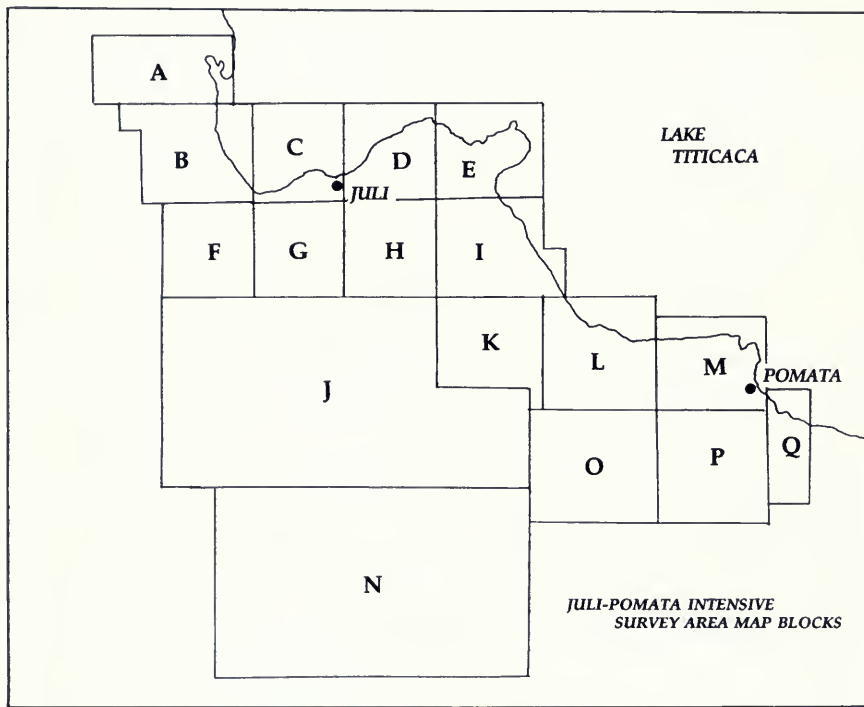


FIG. 107. Key to map blocks.

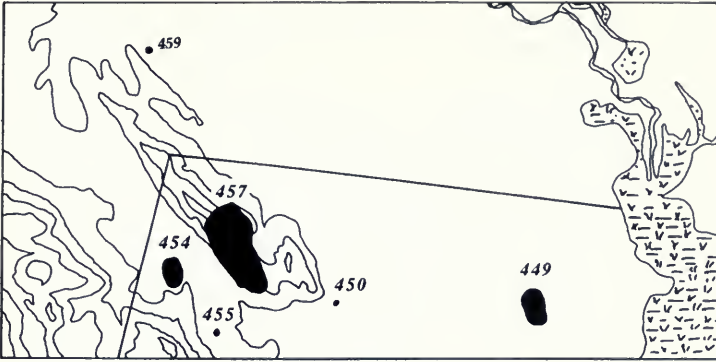


FIG. 108. Map block A.

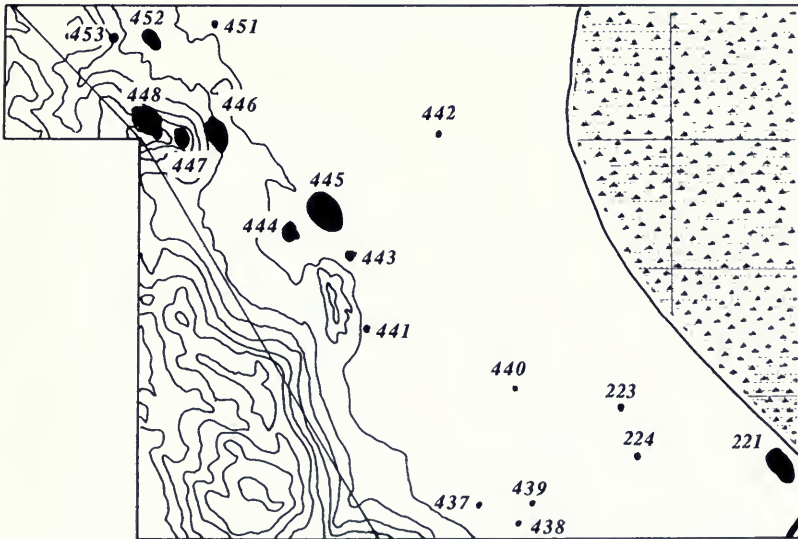


FIG. 109. Map block B.

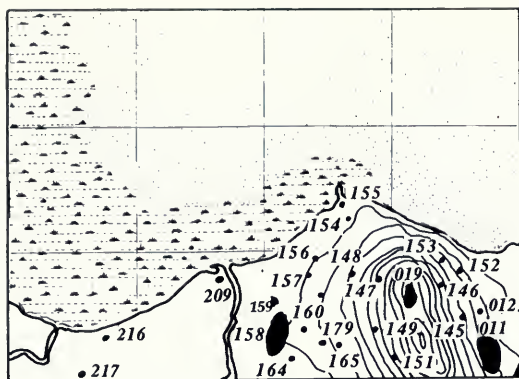


FIG. 110. Map block C.

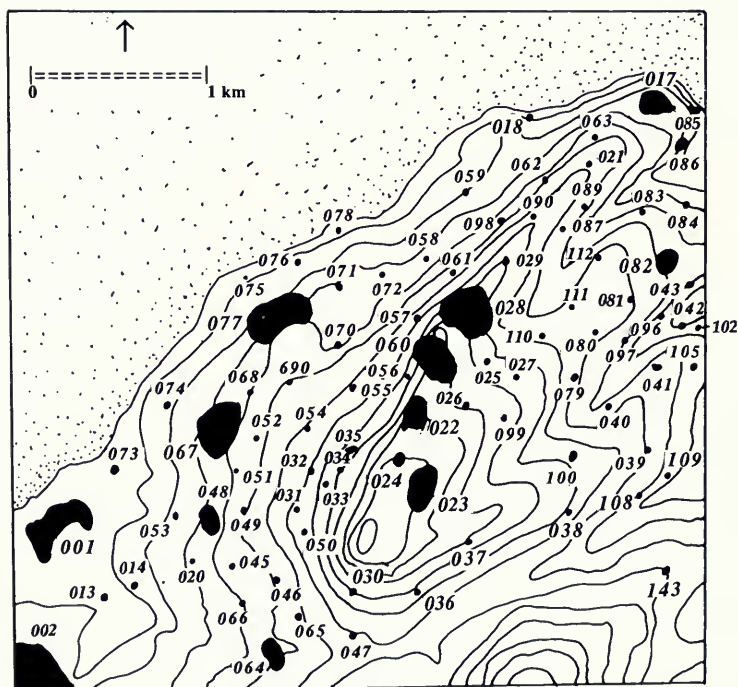


FIG. 111. Map block D.

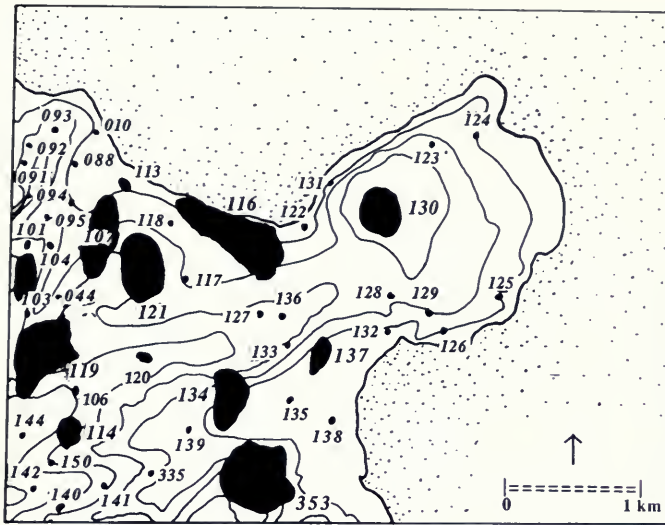


FIG. 112. Map block E.

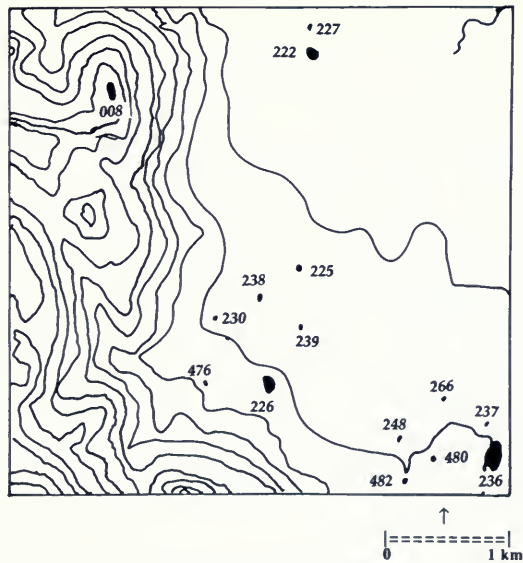


FIG. 113. Map block F.

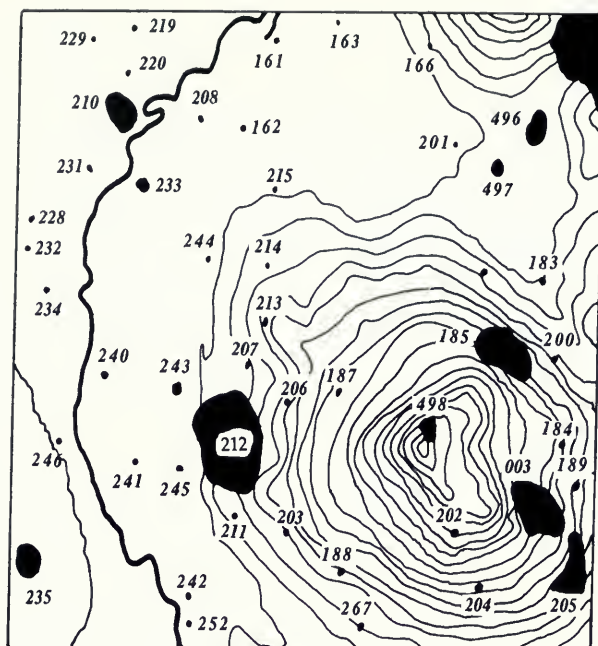


FIG. 114. Map block G.

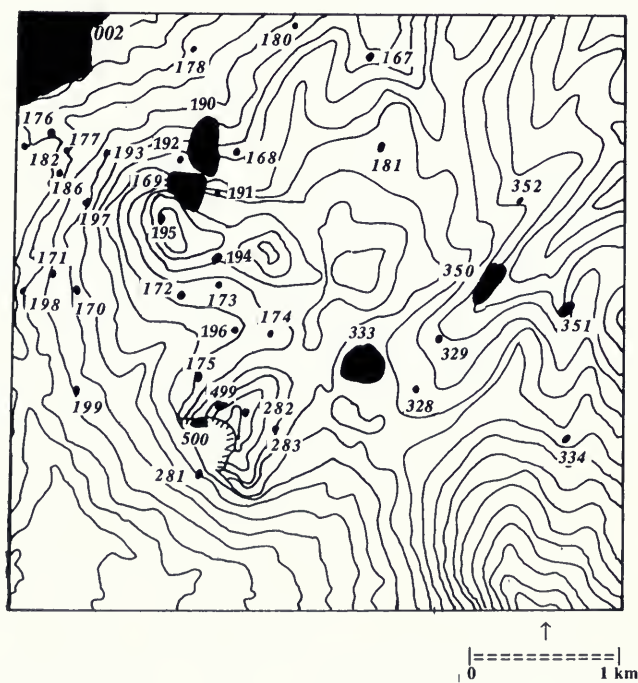


FIG. 115. Map block H.

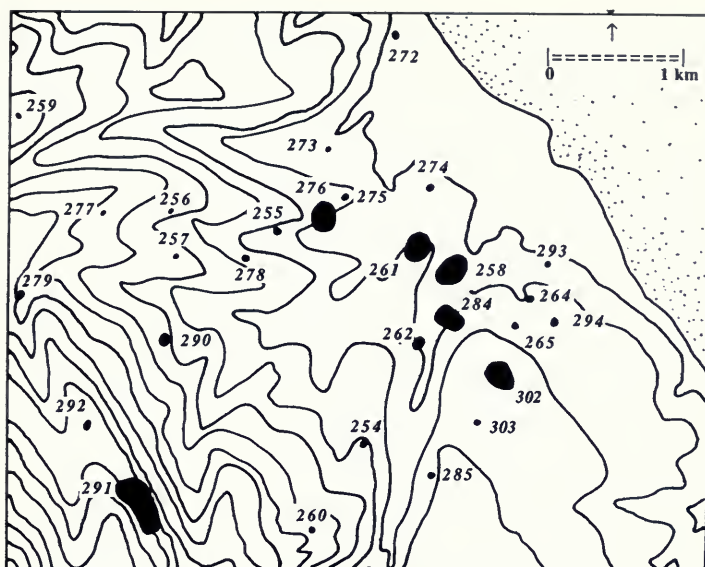


FIG. 116. Map block I.

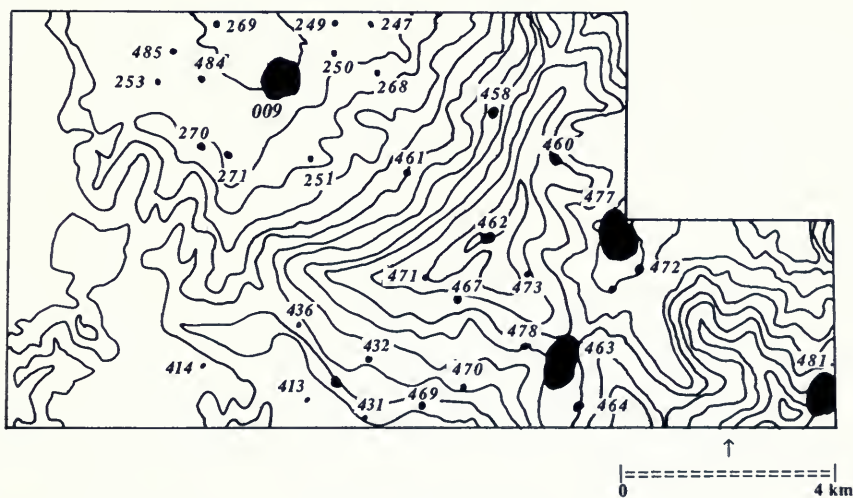


FIG. 117. Map block J.

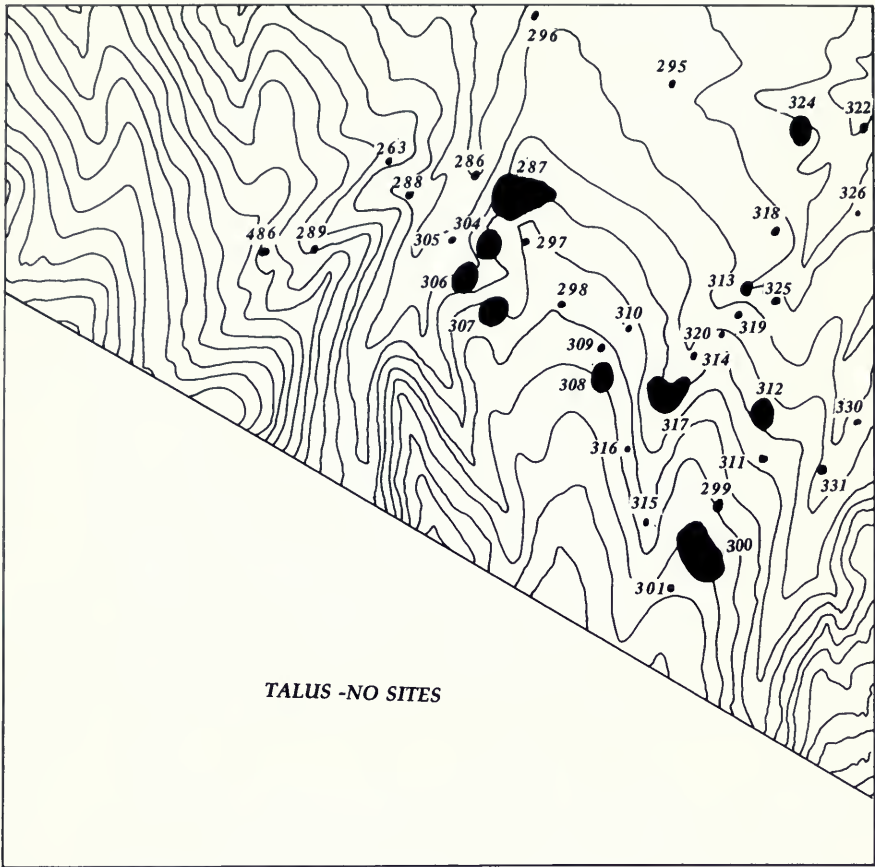


FIG. 118. Map block K.

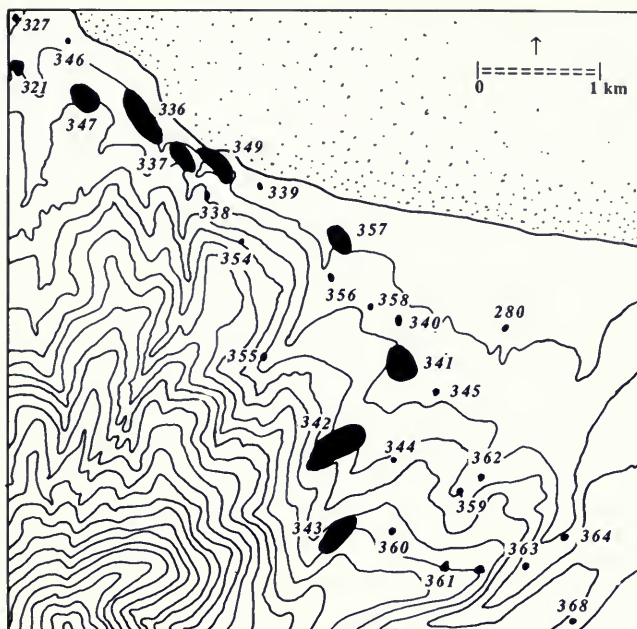


FIG. 119. Map block L.

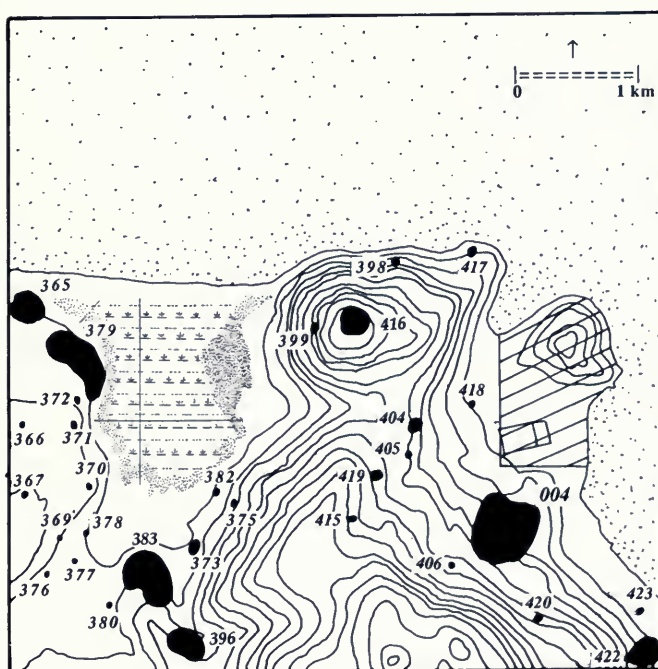


FIG. 120. Map block M.

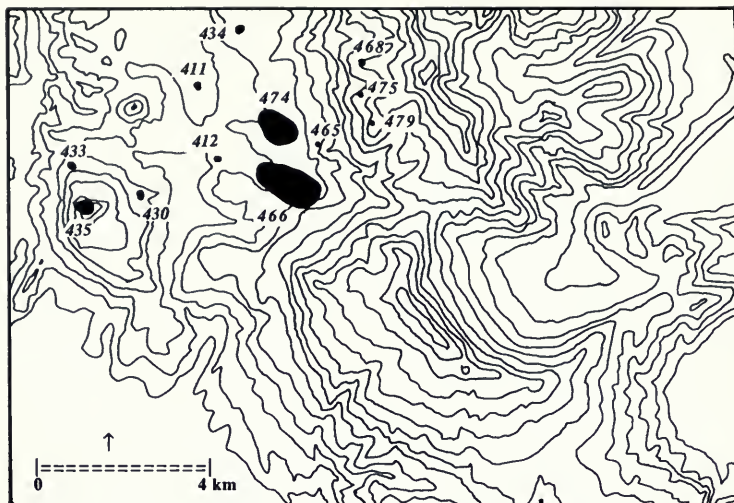


FIG. 121. Map block N.

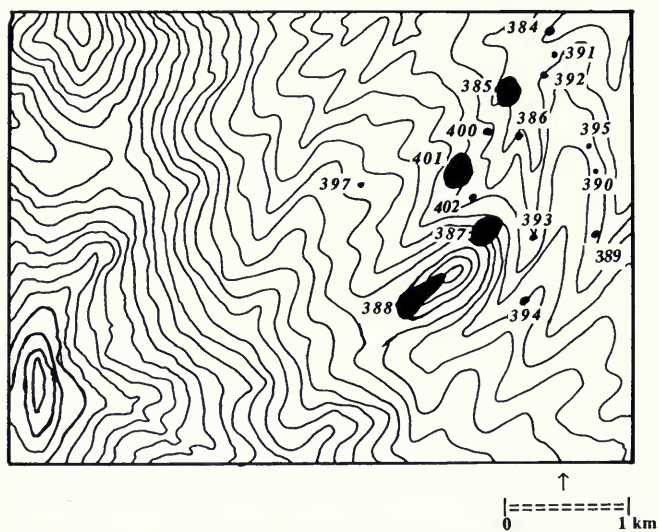


FIG. 122. Map block O.

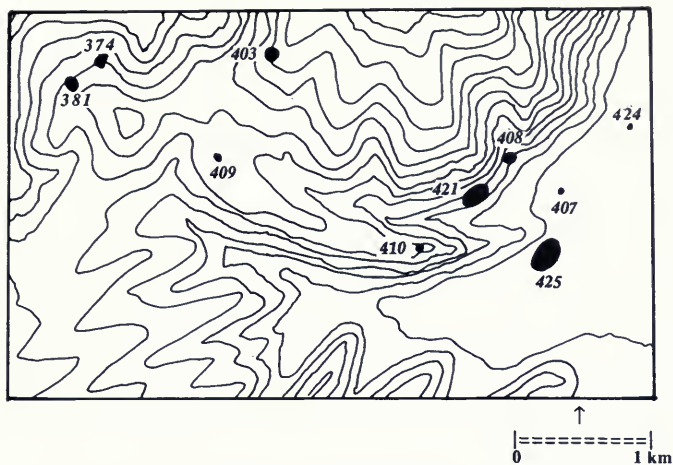


FIG. 123. Map block P.

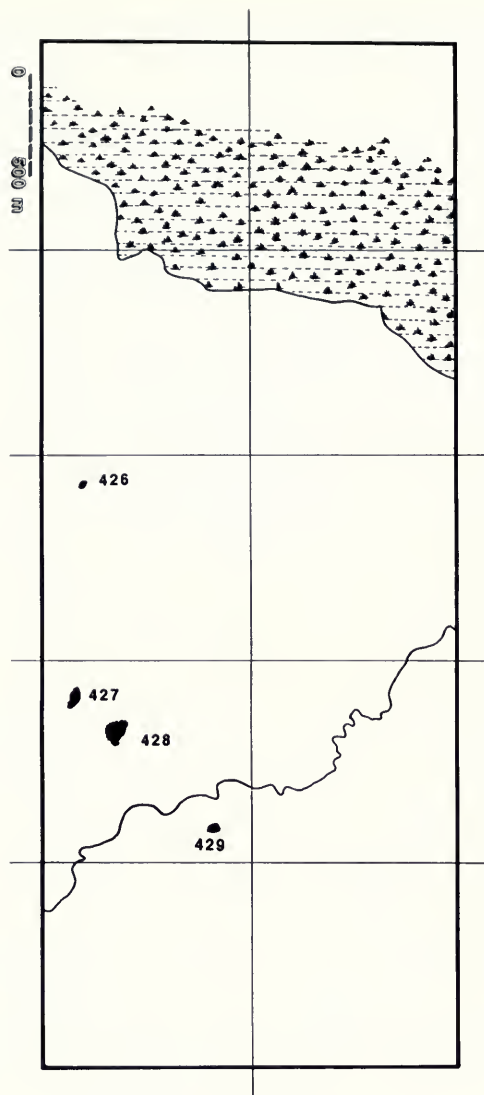


FIG. 124. Map block Q.

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